FS-9

December 1978

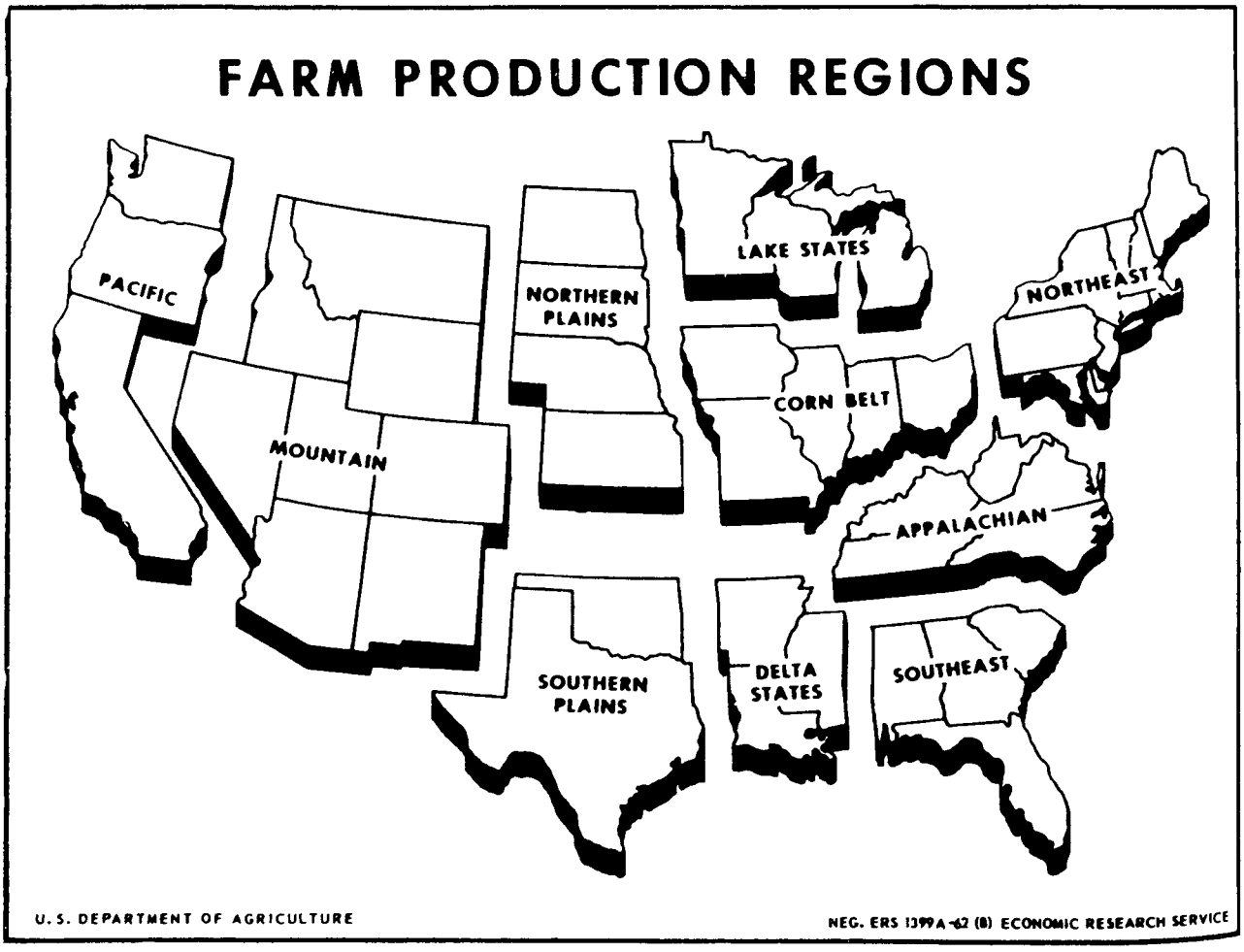
1979 FERTILIZER Situation

Economics, Statistics,
and Cooperatives Service

U.S. Department of Agriculture

Conversion Factors

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



1979 FERTILIZER SITUATION

CONTENTS

• • •

Approved by
The World Food and Agricultural Outlook and Situation Board
and Summary released
December 15, 1978

Principal contributors:
Paul Andrilenas
Richard Rortvedt
(202) 447-6620

National Economic Analysis Division
Economics, Statistics, and Cooperatives Service
U.S. Department of Agriculture
Washington, D.C. 20250

• • •

The *Fertilizer Situation* is published annually.

SUMMARY

An improved agricultural outlook—increased commodity prices, diminished uncertainty about farm programs, and favorable fall field conditions—will likely bring expected 1978/79 fertilizer use up to record 1976/77 levels. Consumption of all primary plant nutrients should increase 7 percent to about 22.1 million tons in 1978/79. Nitrogen consumption will be up 6 percent to about 10.6 million tons. Phosphate and potash consumption will increase about 9 and 6 percent, respectively.

Average fertilizer prices are expected to rise slightly. However, plentiful domestic and international supplies, coupled with relatively slow demand growth, will keep fertilizer prices close to present levels.

Fertilizer inventories, while below spring 1978 peaks, are at high levels and production capacity is adequate to excessive. In addition, imported nitrogen and potash add to the availability of fertilizer materials. Nitrogen inventories this fall are above a year earlier, while phosphate inventories are close to those of a year earlier and potash inventories are lower.

Anhydrous ammonia production capacity, presently operating at 20.9 million tons, is more than adequate. In addition, about 3 million tons of capacity are presently idle. The idle plants, mainly high cost operations, are expected to stay shut down in the near future. The present nitrogen fertilizer supply and demand situation will not allow a significant increase in price, even though natural gas costs are rising.

Domestic capacity to produce wet-process phosphoric acid is estimated to be 9.3 million tons of P_2O_5 annually. Annual U.S. capacity to produce potash is about 2.8 million tons. Canadian potash production capacity is about 8.8 million tons, bringing total capacity for both nations to about 11.6 million tons.

Primary nutrient content of fertilizer materials used in the United States in 1977/78 was down 7 percent to 20.6 million tons. Of the primary nutrients, nitrogen use was down about 6 percent to 10 million tons, phosphate use decreased 9 percent to 5.1 million tons, and potash use was down 5 percent to 5.5 milion tons. Overall fertilizer use was down in all regions except the Pacific and Lake States regions where 1978 use was about the same as in 1977.

Application rates of the three primary nutrients on acreage harvested in 1978 were up for soybeans, but were down for corn, cotton, and wheat. The percent of acres fertilized was down for corn, cotton, and wheat, but up for soybeans.

The value and volume of trade in fertilizer reached record levels in the United States in 1977/78. Exported fertilizer value exceeded that of imported value by a half billion dollars. The United States was again a net exporter of phosphates and a net importer of potash and nitrogen. Canada and Brazil were large buyers of U.S. phosphate products and Canada supplied most U.S. potash imports. Nitrogen imports into the United States originated largely in Canada, the Netherlands, and Trinidad and Tobago. Important new suppliers of U.S. nitrogen imports were Mexico and the USSR.

Ammonia imports more than doubled during the first quarter of 1978/79 but the general level of fertilizer imports remained unchanged. Exports of fertilizers increased by nearly 28 percent with especially strong growth in DAP, phosphoric acid, and urea exports.

In fiscal year 1978, the U.S. Agency for International Development (AID) made commitments to finance fertilizer purchases by developing nations amounting to over 350,000 metric tons—worth over $75 million. These quantities and values increased sharply from last year and commitments are expected to increase further in fiscal year 1979.

Preliminary estimates indicate that total world fertilizer consumption may have reached a new record in 1977/78. Total primary nutrient consumption appears to have increased around 5 percent to just under 100 million metric tons. World fertilizer prices were stronger and more stable than in other recent years. Only ammonia prices declined during 1977/78.

World fertilizer supply capability should be adequate to meet world demand through 1982/83 although surplus supply capabilities for phosphate and potash are expected to decline through that year.

As world food production expands, demand growth for nitrogen and potash will be most rapid in the developing countries while the centrally planned economies will experience the fastest growth in phosphate use. These changes suggest that the developing and centrally planned economies will consume a larger share of the world's fertilizer by 1982/83.

Supply capability is projected to grow at slower rates than demand through 1982/83. Thus, although surplus supply capabilities for all nutrients will likely continue for the next 5 years, the magnitude of that excess will decline, especially for phosphate and potash. The most rapid growth in nitrogen supply capability will occur in the Far East and Near East. Phosphate capacity will grow most quickly in the Near East and Africa. Most potash expansions are expected in Canada and Russia.

World fertilizer trade patterns will likely shift during the next 5 years. Eastern Europe will become a new net importing region for phosphates while the developing countries as a group will shift to being net exporters. The Near East will become a modest, but growing, net exporter of nitrogen.

U.S. FERTILIZER OUTLOOK FOR 1978/79

Fertilizer use in the 1978/79 fertilizer year[1] will rise and likely approach the record 1976/77 level as fertilizer/crop price ratios decline and encourage farmers to increase application rates. Fertilizer supplies, domestic and foreign, will be ample and prices are expected to be stable or slightly higher.

Fertilizer Consumption: Fertilizer use in 1978/79 is expected to make some recovery from diminished 1977/78 levels although grain set-aside and diversion programs similar to the 1978 programs have been announced for 1979 crops. With generally drier weather prevailing, fall 1978 fertilizer consumption is above last year. A more normal spring in 1979 would allow farmers more time to fertilize than in 1978. Commodity prices have improved since last year and the uncertainty about price support programs is diminished.

Expected crop price relationships for 1979 suggest larger cotton and soybean acreage and about the same number of acres for corn. Commodity program announcements will also affect planted acreage.

U.S. consumption of all primary plant nutrients likely will increase 7 percent to about 22.1 million tons. Nitrogen consumption may be about 10.6 million tons and phosphate and potash consumption about 5.6 and 5.9 million tons, respectively.

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

Fertilizer Supply and Inventories: Fertilizer supplies should be plentiful. Adequate capacity is available, especially in the nitrogen sector where there is excess anhydrous ammonia capacity.

Nitrogen

The nitrogen sector of the fertilizer industry will be plagued, as it was last year, with excess anhydrous ammonia capacity. Some nitrogen fertilizer producers with relatively more expensive natural gas feedstocks have reduced losses by permanently closing plants, and are purchasing ammonia from other lower cost domestic and foreign producers. Other high cost ammonia producers have temporarily idled plants. About 3.0 million tons of capacity, or about 13 percent of 22.7 million tons of capacity available in early 1978, are idle. Unless ammonia prices increase significantly, this capacity will remain shut down. The current operating capacity of about 20.9 million tons of ammonia is adequate to produce the 16 to 18 million tons of ammonia required for all uses.

Large manufacturers' inventories of nitrogen, up about 39 percent in July over a year earlier, contributed to downward pressures on prices. Inventories of ammonia and nitrogen solutions were up the most. Since spring, inventories decreased due to seasonal demand, but increased again in the first quarter of 1978/79 when total nitrogen inventories were near year-earlier levels. Inventories of anhydrous ammonia are up slightly, while inventories of nitrogen solutions and ammonium sulfate are well above those of a year earlier (figure 1 and table 1).

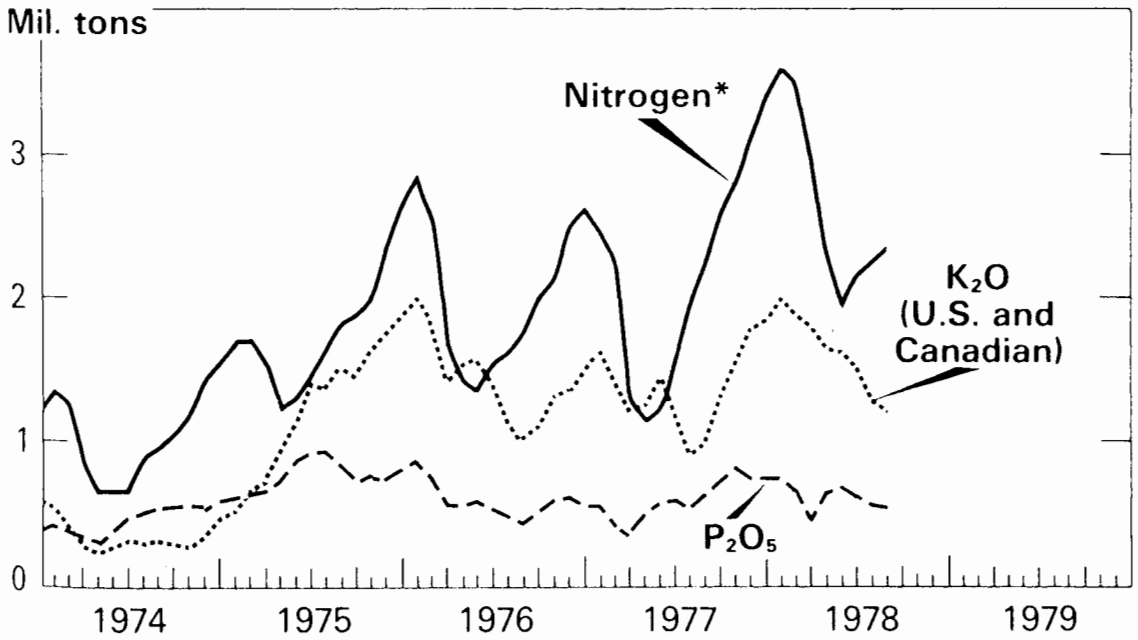
Phosphates

Domestic annual capacity to produce wet-process phosphoric acid was estimated at about 9.3 million tons of P_2O_5. Capacity for 1978/79 is expected to remain about the same.

Inventories of phosphate fertilizers have declined and probably will continue to do so as consumption increases in 1978/79, but production will remain ample to meet domestic needs and the export market.

Fertilizer Manufacturers' Inventories, 1974 to 1978

Nitrogen, P_2O_5 and K_2O



*Does not include urea.

USDA

Neg. ESCS 2623 78 (12)

Figure 1

Table 1—Manufacturers' inventories of nitrogenous and phosphatic fertilizer materials and phosphoric acid, United States, and muriate of potash, United States and Canada, October 1, 1977 and 1978

Material	October 1, 1977[1]	October 1, 1978[1]	Change
	1,000 tons		*Percent*
Nitrogenous fertilizer inventories:[2]			
Anhydrous ammonia[3]	2,000	2,064	+3
Ammonium nitrate, solid	282	274	-3
Nitrogen solutions	451	530	+18
Ammonium sulfate[4]	205	253	+23
Phosphatic fertilizer inventories:[5]			
Normal and enriched superphosphate	50	36	-28
Concentrated superphosphate	112	115	-3
Diammonium phosphates	322	156	-51
Other ammonium phosphates	73	57	-22
Other phosphatic fertilizer materials	17	19	+11
Total phosphatic fertilizers	574	383	-33
Wet process phosphoric acid inventories:[5]	159	169	+6
Muriate of potash inventories:[6]			
United States	277	386	+39
Canada	732	892	+22

[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, byproduct coke oven, and by product, other than coke oven. [5] Reported in 1,000 tons of P_2O_5. [6] Reported in 1,000 tons of K_2O.

Source: Nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, "Inorganic Fertilizer Materials and Related Products", September 1978, U.S. Dept. of Commerce, Bureau of the Census. Muriate of potash: Potash/phosphate Institute.

Phosphate rock sold or used by producers in 1977/78 totaled 52.5 million tons, up over 8 percent from year-earlier levels. The export market continued to strengthen demand with rock exports up about 22 percent in 1977/78 to 14.1 million metric tons. In contrast to upgraded phosphate fertilizer products, stocks of phosphate rock on June 30, 1978 were 20 percent above year-earlier levels. In the July-September 1978 quarter, U.S. producers' inventories of phosphate rock remained above year-earlier levels.

Potash

Imports will again provide the major share of potash with plentiful supplies available from Canadian producers. 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, bringing total production capacity for both nations to about 11.6 million tons. U.S. potash production capacity is expected to decline somewhat in the next few years, but this will be offset by an increase in Canadian capacity from mines to be opened in New Brunswick. Although potash inventories in the United States and Canada have declined since the start of 1978/79, the combined inventories for the two countries remained 27 percent above year-earlier levels on October 1, 1978 (table 1). They declined to below year-earlier levels by November 1, 1978.

Fertilizer Prices: Prices of nitrogen fertilizers generally are expected to remain close to present low levels during the remainder of the year. Large domestic inventories, increased availability of anhydrous ammonia from foreign sources, and slow growth in demand are factors which prevent significant price increases.

In contrast, prices of phosphate fertilizers in 1978/79 will hold firm with a chance for modest increases. Strong export demand for phosphate rock and diammonium phosphate supported modest price increases last year and may do the same in 1979.

Prices paid by farmers for potash are up over 4 percent from a year earlier and could rise by a similar amount by spring due to strong overseas demand for Canadian potash.

SPECIAL CONDITIONS IN NITROGEN SECTOR

The nitrogen sector of the fertilizer industry is undergoing significant change. The buildup in excess capacity has had far-reaching and debilitating effects on the industry. Firms are currently adjusting to low prices, excess capacity, increasing imports, and rising natural gas costs. The ramifications of more costly feedstocks will undoubtedly lengthen the time needed for the industry to adjust and again operate normally and profitably.

The present situation began in 1975 when tight supplies and expanding demand caused prices to increase sharply. Heavy investment in ammonia production capacity followed and anhydrous ammonia capacity increased about 24 percent from 18.3 million tons in 1975 to about 22.7 million tons by January 1978.

High fertilizer prices in 1975 and uncertain farm income prospects and wet field conditions in early 1978 caused fertilizer use to decline in both years.

Production, however, already at high levels, increased substantially. Manufactuers' seasonally high inventories of nitrogen rose from 1.7 million tons in February 1975 to a high of over 3.6 million tons in February 1978. During the same period, the average price farmers paid for anhydrous ammonia dropped about 33 percent, from $265 to $177 per ton.

The inventory buildup and price drop forced ammonia producers to adjust output by idling capacity. About 3 million tons of capacity are presently closed or idle and operating capacity is currently less than 21 million tons. Because the present nitrogen fertilizer supply-demand situation will not allow a significant increase in price, the high cost plants that are presently closed or idle will remain unprofitable to operate in the foreseeable future.

The nitrogen industry is facing a domestic supply-demand situation comparable to 1976/77. The present operating capacity of less than 21 million tons compares with a capacity of 21.5 million tons in June 1977. Consumption is expected to total about 10.6 million tons in 1978/79, or about the same as in 1976/77. Since nitrogen consumption and ammonia production capacities are comparable to the more balanced 1976/77 fertilizer year, the present excess capacity and low price cycle could be expected to bottom out under normal circumstances. But the effects of continuing low prices, the availability of ammonia from offshore sources, idle plant capacity, and further natural gas feedstock price increases will prevent a quick turnaround in the profitabilty of ammonia production.

The immediate global demand picture for agricultural commodities precludes a substantial change in planted acres that would significantly increase fertilizer demand and prices. Good weather in the world's major agricultural areas has produced record harvests. With the exception of the People's Republic of China and Brazil, no major world buyer is expected to substantially increase imports of grain.

Nitrogen imports have added to the surplus supply problem, primarily because of increased imports of anhydrous ammonia. Imports have taken over a part of the market required by domestic producers to more fully utilize production capacity.

High prices for natural gas feedstocks are hindering the ability of certain ammonia producers to compete effectively at today's nitrogen prices. This situation is not likely to improve in the immediate future. The recently passed Natural Gas Policy Act would allow gas prices to increase further, by permitting them to increase at or in excess of the rate of inflation. The act also provides fertilizer producers with some protection from gas curtailments.

A bright spot in the nitrogen fertilizer demand picture is the market for the upgraded products—urea and ammonium phosphates. Domestic and foreign consumption of these products has remained strong and prices are not as depressed as those of anhydrous ammonia. October 1978 prices paid by farmers for anhydrous ammonia are down from a year earlier. Urea and diammonium phosphate prices are about the same as a year earlier.

CURRENT SITUATION AND OUTLOOK FOR U.S. FERTILIZER TRADE

Fertilizer imports and exports in 1978/79 will probably have greater influence upon domestic prices and capacity utilization than in other recent years. Low cost ammonia imports will hold prices at current low levels and prevent idled domestic plants from restarting. The export market will be more appealing to domestic producers saddled with high inventories. Strong overseas demand will be an important influence in increasing phosphate prices in the face of slow growth in domestic markets.

Imports

Although the quantity of total fertilizer imported is virtually unchanged for the first quarter of the 1978/79 fertilizer year, at about 3 million metric tons, the composition of imports has shifted significantly. Anhydrous ammonia imports have more than doubled to over 400,000 metric tons, but that increase is nearly offset by declining imports of urea, potash, nitrogen solutions, and ammoniated phosphates.

U.S. ammonia imports from Mexico totaled about 100,000 metric tons during the July-September quarter, up from about 8,500 metric tons a year earlier. This amount may be approached in subsequent quarters as Mexico has announced intentions to export about 600,000 metric tons of ammonia this year with at least 40 percent of that earmarked for the United States.

Ammonia imports from the USSR totaled 94,500 metric tons in July-September 1978 compared with none during that quarter of 1977. Russian ammonia began to flow into the United States last winter under the first phase of a long-term fertilizer trade agreement between a U.S. firm and the Soviet Union. Under terms of the agreement, the firm is to take delivery of 950,000 metric tons of ammonia in 1979 and ship much of it to the United States. Thus, increased Russian ammonia imports are almost certain this year.

Exports

A relatively weak domestic market has prompted U.S. producers to vigorously seek overseas customers. U.S. producers in July-September 1978 exported about 7.6 million metric tons of products, nearly 28 percent more than a year earlier. Increased quantities of urea, diammonium phosphate (DAP), phosphoric acid, concentrated superphosphate, and phosphate rock were exported. Much of the increased DAP exports went to Italy, India, Turkey, and the People's Republic of China. Increased urea exports were primarily purchased by Brazil and India.

Led by strong growth in diammonium phosphate, concentrated superphosphate, and phosphoric acid shipments, exports of phosphate nutrients during July-September 1978 exceeded those of the same period in 1977 by 24 percent. The first shipment of Florida superphosphoric acid to the Soviet Union arrived in late 1978. Quantities shipped will increase until reaching 1 million metric tons per year by 1980 in accordance with terms of a long-term fertilizer trade agreement between the USSR and a U.S. firm.

When nitrogen trade is examined in terms of nutrient content, the July-September 1978 quarter registered a net export balance of about 166,000 metric tons. Exports totaled about two-thirds of a million metric tons of nitrogen, mostly in the form of DAP and urea, while about one-half million metric tons were imported. The fertilizer industry has apparently responded to increased cheap ammonia imports by trying to increase exports of more valuable upgraded nitrogen fertilizer products.

U.S. FERTILIZER INVENTORIES, PRODUCTION LEVELS, PRICES AND USE—1977/78

Manufacturers Inventories

Adequate to excessive fertilizer production capacity, coupled with a demand situation that saw fertilizer use decline, caused fertilizer manufacturers' inventories to increase substantially in the first half of the 1977/78 year. Inventories dropped seasonally during 1977/78, but nitrogen and potash inventories remained above year-earlier levels (figure 1). In September 1978 phosphate inventories fell below those of a year earlier but potash inventories did not decline below year-earlier levels until October.

Inventories of nitrogenous fertilizers were up most. Manufacturers' inventories of synthetic anhydrous ammonia prior to the 1978 spring fertilization season were up to about 3.3 million tons on March 1, 1978, or 40 percent above a year earlier (table 2). Also, inventories of ammonium nitrate, and nitrogen solutions were substantially higher. As fertilizer manufacturers produced less ammonia and nitrogen solutions, exported more diammonium phosphates and urea, and moved fertilizer out for the fall season, inventories dropped closer to year-earlier levels. However, manufacturers' nitrogen inventories on October 1, 1978 were greater than in any of the previous 5 years and 6 percent above a year earlier.

In March 1978, inventories of ammonium phosphates reached unusually high levels with inventories of diammonium phosphate 83 percent above a year earlier. Stocks of normal and enriched superphosphates and phosphoric acid also increased. Total inventories of phosphate fertilizers were up about 48 percent while inventories of phosphoric acid were up less than 20 percent. Manufacturers' phosphate inventories declined during the 1978 spring application season, increased again in the summer, and declined to more normal levels in September 1978. Increased shipments brought October 1, 1978 inventories for several phosphate fertilizers below year-earlier levels (table 1).

Inventories of potash fertilizers at the manufacturers' level were up on March 1, 1978 from a year earlier. Producers' potash stocks were up 32 percent while stocks of Canadian producers were up over 20 percent. On October 1, 1978, stocks were still above year-earlier levels by about the same percentage, but declined below year-earlier levels by November.

Fertilizer Production Levels

Anhydrous ammonia production in 1977/78 was up over 4 percent to 17.5 million tons (table 3).

Table 2—Manufacturers' inventories of nitrogenous and phosphatic fertilizer materials and phosphoric acid, United States, and muriate of potash, United States and Canada, March 1, 1977 and 1978

Material	March 1, 1977[1]	March 1, 1978[1]	Change
	1,000 tons		*Percent*
Nitrogenous fertilizer inventories:[2]			
Anhydrous ammonia[3]	2,349	3,278	+40
Ammonium nitrate, solid	243	413	+70
Nitrogen solutions	393	655	+67
Ammonium sulfate[4]	262	N/A	N/A
Phosphatic fertilizer inventories:[5]			
Normal and enriched superphosphate	50	55	+10
Concentrated superphosphate	126	154	+22
Diammonium phosphates	142	260	+83
Other ammonium phosphates	53	79	+49
Other phosphatic fertilizer materials	16	23	+44
Total phosphatic fertilizers	387	571	+48
Wet process phosphoric acid inventories:[5]	147	198	+35
Muriate of potash inventories:[6]			
United States	433	573	+32
Canada	1,161	1,424	+23

[1] All figures subject to revision. [2] Nitrogen solutions reported in 1,000 tons of N. Others reported in 1,000 ton s of material. [3] Includes material for nonfertilizer use. [4] Includes synthetic, byproduct coke oven, and by product, other than coke oven. [5] Reported in 1,000 tons of P_2O_5. [6] Reported in 1,000 tons of K_2O. N/A: Data withheld to avoid disclosing figures for individual companies.

Sources: Nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, "Inorganic Fertilizer Materials and Related Products", February and March 1978, U.S. Dept. of Commerce, Bureau of the Census. Muriate of potash: Potash Institute of North America.

Production of ammonium nitrate and ammonium sulfate was down, while urea and nitrogen solutions were up. Production of nitrogenous fertilizer materials was ahead of year-earlier levels early in the fertilizer year, but, as inventories grew, production was adjusted downward. Total production of processed phosphate fertilizer in 1977/78 was up about 9 percent to over 6.9 million tons of P_2O_5 (table 3). Production of concentrated superphosphate was up 2 percent, while production of diammonium phosphate and wet-process phosphoric acid was up 15 and 5 percent, respectively.

Combined U.S. and Canadian production of muriate of potash was up over 7 percent. U.S. production was up slightly to about 2.3 million tons, but Canadian production rose close to 10 percent to 6.8 million tons.

Although production of many fertilizer materials was adjusted downward during the fertilizer year to reflect reduced domestic demand, the production of two upgraded products, urea and ammonium phosphates, was substantially above year-earlier levels. As domestic demand declined, producers saw an opportunity to move fertilizer materials in the export market. In the 1977/78 fertilizer year, exports of urea more than doubled and ammonium phosphate exports increased about 29 percent from a year earlier. Consequently, production of urea and diammonium phosphate was up 26 and 15 percent, respectively. This situation has continued since July 1978, with production of diammonium phosphate in September 1978 still holding above year-earlier levels.

Farm Prices for Fertilizers

Excess supply caused pressure on fertilizer prices during the 1977/78 fertilizer year. Prices of nitrogen fertilizers were down the most, while

Table 3—Production of nitrogenous and phosphatic fertilizer materials and phosphoric acid, United States, and muriate of potash, United States and Canada, years ending June 30, 1977 and 1978

Material	1977[1]	1978[1]	Change
	1,000 tons		*Percent*
Nitrogenous fertilizers:[2]			
Anhydrous ammonia[3]	16,791	17,490	+4
Ammonium nitrate, solid	3,273	3,051	-7
Urea	3,982	5,022	+26
Nitrogen solutions	2,370	2,582	+9
Ammonium sulfate[4]	2,489	2,333	-6
Phosphatic fertilizers:[5]			
Normal and enriched superphosphate	361	290	-20
Concentrated superphosphate	1,746	1,778	+2
Diammonium phosphates	3,253	3,714	+15
Other ammonium phosphates	821	893	+8
Other phosphatic fertilizer materials	230	283	+23
Total phosphatic fertilizers	6,411	6,958	+9
Wet process phosphoric acid:[5 6]	7,750	8,161	+5
Muriate of potash:[7]			
United States	2,260	2,294	+2
Canada	6,234	6,842	+10

[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, byproduct 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 1978 and earlier issues, U.S. Dept. of Interior, Bureau of Mines. Urea: "Preliminary Report on U.S. Production of Selected Synthetic Organic Chemicals", February 1978 and earlier issues, U.S. International Trade Commission and *Current Industrial Reports*, M28B, "Inorganic Fertilizer Materials and Related Products," February-August 1978 issues. Other nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, "Inorganic Fertilizer Materials and Related Products," August 1978 and earlier issues, U.S. Dept. of Commerce, Bureau of the Census. Muriate of Potash: Potash/phosphate Institute.

phosphate and potash prices were down less or close to those of a year earlier.

Nitrogen Fertilizer Prices: Excess production capacity and reduced demand caused prices of nitrogen fertilizer materials to fall below year-earlier levels. Average prices paid by U.S. farmers for anhydrous ammonia were down the most while urea prices were close to year-earlier levels. Prices of other nitrogen fertilizers ranged from close to or moderately below those of a year earlier (tables 4 and 5).

Prices of nitrogen fertilizers generally are expected to remain close to present low levels. High levels of domestic inventories, increased avail-

Table 4—Average prices paid by farmers per ton of selected fertilizers, United States, April 15 prices, 1967-76, May 15 prices 1977-78 and October 15 prices 1977-78

Year	Anhydrous ammonia	Superphosphate		18-46-0	Potash 60 percent K_2O	Mixed fertilizer 6-24-24
		46 percent P_2O_5	20 percent P_2O_5			
	Dollars					
1967	113.00	84.10	42.10	113.00	[1] 58.47	85.70
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:						
May 15	188.00	148.00	103.00	185.00	96.90	145.00
Oct. 15	177.00	150.00	100.00	187.00	94.50	146.00
1978:						
May 15	171.00	[2] 153.00	100.00	186.00	96.40	150.00
Oct. 15	164.00	[2] 153.00	108.00	187.00	98.90	148.00

[1] Based on equivalent price for 55 percent K_2O reported by SRS. [2] Specifications charged to 44%-46% P_2O_5.

Source: "Agricultural Prices", USDA, ERS, Pr 1 (10-78) and earlier issues.

Table 5—Average prices paid by farmers per 20-pound unit of nitrogen contained in nitrogenous materials, United States, 1967-1978

Year	Nitrate of soda	Sulfate of ammonia	Ammonium nitrate	Urea	Anhydrous ammonia	Nitrogen solutions percent N		
						28	30	32
	Dollars							
1967	3.76	2.64	2.21	2.18	1.38	---	---	---
1968	3.74	2 63	2.03	2.02	1.11	1.95	2.09	2.06
1969	3.74	2.56	1.84	1.84	.92	1.49	1.79	1.80
1970	3.89	2.56	1.79	1.82	.91	1.64	1.80	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:								
May 15	9.17	4 97	4.30	3.72	2.29	4.11	4.03	4.25
Oct. 15	9.24	5.00	4.28	3.66	2.14	4.00	3.96	4.24
1978:								
May 15	9.19	5.21	4.14	3.74	2.08	3.96	3.90	4.16
Oct. 15	9.19	5.40	4.11	3.71	2.00	3.78	3.77	4.03

Source: Computed from "Agricultural Prices", USDA, ESCS, Pr 1 (10-78) and earlier issues.

ability of anhydrous ammonia from foreign sources, and fairly slow demand growth will prevent any significant increase in price.

Phosphate Fertilizer Prices: Prices paid by farmers for phosphate fertilizers are close to year-earlier levels (tables 4 and 6). Strong exports of ammonium phosphate, phosphate rock, and other phosphate fertilizer materials added strength to prices.

Phosphate prices are expected to hold firm in 1978/79. Exports should continue at 1977/78 levels or higher and consumption should be up somewhat from a year earlier. Increased domestic consumption should reduce inventories and add strength to phosphate fertilizer prices.

Potash Fertilizer Prices: Prices of potash fertilizer were close to year-earlier levels (tables 4 and 6). A stable demand and production situation with a need to work off some excess stocks will keep prices stable. Prices paid by farmers in October 1978 were up about 4 percent from a year earlier. Potash prices could rise again in the spring by the same amount due to strong export demand.

Table 6—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, 1967-78

Year	Superphosphate		Muriate of potash[3]
	Normal[1]	Concentrated[2]	
	Dollars		
1967	2.11	1.83	.97
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:			
May 15	5.15	3.22	1.61
Oct. 15	5.00	3.26	1.56
1978:			
May 15	5.00	3.40	1.63
Oct. 15	5.40	3.40	1.64

[1] 20 percent P_2O_5. [2] 46 percent P_2O_5. 44%-46% after 1977. [3] 60 percent K_2O; 55 percent K_2O prior to 1968.

Source: Computed from "Agricultural Prices", USDA, ESCS, Pr 1 (10-78) and earlier issues.

Fertilizer Use Estimates

In the 12-month period ending June 30, 1978, nearly 47.6 million tons of fertilizer materials were used in the United States and Puerto Rico (table 7). This represents a decrease of 4 million tons or 8 percent from a year earlier. Use of all primary nutrients was down 7 percent to 20.6 million tons. Of the primary nutrients, nitrogen use was down about 6 percent to 10.0 million tons, phosphate use decreased 9 percent to 5.1 million tons, and potash use was down 5 percent to 5.5 million tons (table 7).

Regional Variations: Most of the regions showed a decline in use except for the Lake States and Pacific regions (table 8). Reduced acres and lower application rates were the primary causes of

Table 7—All fertilizer: Total use and primary nutrient use, United States, 1965-1978[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	43,288	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	47,587	9,973.4	5,099.3	5,526.7	20,599.5	147.4

[1] Includes Puerto Rico.

Source: "Commercial Fertilizers, Consumption for year ended June 30, 1978, USDA, ESCS, SpCr 7 (11-78) and earlier issues.

Table 8—Total use of primary nutrients by regions, years ended June 30, 1977 and 1978[1]

Region	1977	1978[2]	Change
	1,000 tons		*Percent*
Northeast	984	921	-6
Lake States	2,497	2,508	1
Corn Belt	7,324	6,681	-9
Northern Plains	2,450	2,285	-7
Appalachian	1,866	1,690	-9
Southeast	2,177	1,954	-10
Delta States	992	892	-10
Southern Plains	1,529	1,393	-9
Mountain	824	806	-2
Pacific	1,430	1,436	1
United States	22,074	20,565	-7

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

decreased fertilizer use. Less acres were planted as the result of a depressed commodity price outlook and considerable uncertainty about the nature of Government programs. Wet field conditions also contributed to lower application rates in some important areas. In the northern areas of the Northern Plains and Mountain regions and the Lake States regions the late season gave farmers an opportunity to better assess prospective commodity prices and Government programs; consequently, the result was less reduction in fertilizer use in these areas.

Nitrogen use was down in 8 of 10 crop production regions with use declining the most in the Appalachian, Southeast, and Delta regions. Use was about the same in the Mountain and Pacific regions (table 9). Phosphate use was down in all regions with use in the Northern Plains and Southern Plains regions down the most (table 10). Potash use was also down in 8 of 10 regions with use down the greatest percentage in the Northern Plains region (table 11). Decreased fertilizer application on corn in the Corn Belt was an important factor contributing to a decline in fertilizer use in this region. In the Southeast, fewer corn and cotton acres and lower fertilizer application rates contributed to reduced fertilizer use. Decreased use on cotton contributed to a decline in use in the Delta region.

Table 10—Use of phosphate as fertilizer, by regions, years ended June 30, 1977 and 1978[1]

Region	1977	1978[2]	Change
	1,000 tons $P2O^5$		*Percent*
Northeast	310	285	-8
Lake States	623	613	-2
Corn Belt	1,844	1,645	-11
Northern Plains	581	500	-14
Appalachian	526	475	-10
Southeast	485	440	-9
Delta States	237	215	-9
Southern Plains	391	337	-14
Mountain	272	241	-11
Pacific	354	342	-3
United States	5,623	5,093	-9

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

Use of Mixtures and Direct Application Materials: The proportion of fertilizers applied as a mixture declined slightly to 46 percent of all fertilizers in 1977/78. Direct applications increased to 54 percent of total fertilizer use (table 12).

Use of Dry Bagged, Dry Bulk, and Liquid Fertilizers: The trend toward increased use of liquid fertilizers continued in 1977/78 (table 13). The proportion of total fertilizer tonnage applied as a liquid increased to 33 percent. The increase came at the expense of dry bagged materials whose proportion declined to about 16 percent of total tonnage.

Table 9—Use of nitrogen as fertilizer, by regions, years ended June 30, 1977 and 1978[1]

Region	1977	1978[2]	Change
	1,000 tons N		*Percent*
Northeast	344	322	-6
Lake States	942	922	-2
Corn Belt	3,096	2,874	-7
Northern Plains	1,710	1,643	-4
Appalachian	701	607	-13
Southeast	903	778	-14
Delta States	488	420	-14
Southern Plains	1,005	929	-8
Mountain	515	528	2
Pacific	926	936	1
United States	10,631	9,959	-6

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

Table 11—Use of potash as fertilizer, by regions, years ended June 30, 1977 and 1978[1]

Region	1977	1978[2]	Change
	1,000 tons K^2O		*Percent*
Northeast	330	314	-5
Lake States	932	973	4
Corn Belt	2,384	2,162	-9
Northern Plains	158	142	-10
Appalachian	639	607	-5
Southeast	789	736	-7
Delta States	267	258	-4
Southern Plains	133	127	-4
Mountain	37	37	-1
Pacific	150	158	5
United States	5,820	5,514	-5

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

Table 12—All fertilizer: Mixtures and direct-application materials used, averages 1951-1970, annual 1971-1978, 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	47,587	22,121	46	25,466	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 (11-78) and earlier issues. "Commercial Fertilizers, Consumption of Commercial Fertilizers, Primary Plant Nutrients, and Micronutrients", USDA, SRS, Statistical Bulletin No. 472.

Table 13—All fertilizers: Use by class, mixtures and direct application materials 1967-1978[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	7,501.4	16	23,235.0	51	14,973.8	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, 1978", USDA, ESCS, SpCr 7 (78), and earlier issues.

FERTILIZER USE ON CROPS—1977/78

Fertilizer application rates in the 1977/78 fertilizer year reflected weather conditions and the uncertainties associated with farm price prospects, and farm program provisions. Application rates of nitrogen were up for soybeans, but were down for corn, cotton, and wheat (table 14). Application rates of P_2O_5 were up for cotton, down for wheat, and the same for corn and soybeans. Potash application rates increased on cotton and soybeans, and decreased for corn and wheat. Farmers fertilized a smaller proportion of corn, cotton, and wheat acres in 1977/78. Fewer uncertainties affected soybeans so a higher proportion of soybean acres were fertilized.

Corn for Grain: Fertilization of corn acres took about 41 percent of the nitrogen, 39 percent of the P_2O_5, and 40 percent of the K_2O used in the United States in 1977/78.

The 17 States surveyed for fertilizer use on corn accounted for 91 percent of total acreage of corn harvested for grain in the United States. Of the fields surveyed in 1978, 95 percent received some fertilizer, down from 96 percent in 1977. This reduction reflects the decrease in the proportion of acreage receiving the three fertilizer nutrients—nitrogen, phosphate, and potash (table 15).

In 1978, nitrogen was applied to corn for grain at the rate of 126 pounds per acre, down from a year earlier. The application rate of 68 pounds for P_2O_5 was the same as 1977, while K_2O use was down. Although fertilizer applications on corn decreased, use was adequate to achieve a record corn yield in 1978 due to unusually good growing conditions.

Cotton: The 11 cotton-producing States surveyed accounted for 98 percent of total U.S. acreage harvested in 1978 (table 16). Of the fields surveyed, 69 percent received some fertilizer, down substantially from the previous year. The proportion of cotton acreage receiving nitrogen and phosphate declined about 10 percent for each of these fertilizer nutrients, while the proportion of acreage receiving potash declined about 6 percent.

The amount of nitrogen applied to cotton in

Table 14—Estimates of fertilizers used on harvested acres of corn for grain, cotton, soybeans for beans, and all wheat, United States, 1974-78

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								
1974	94	94	87	83	103	62	73	65,405
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	70,006
1978	95	95	87	81	126	68	80	68,064
Cotton								
1974	79	79	58	46	78	53	55	12,547
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	13,259
1978	69	69	45	31	76	54	54	12,284
Soybeans								
1974	30	22	28	28	15	41	55	51,341
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	57,911
1978	37	25	35	36	17	45	62	63,268
All wheat								
1974	66	66	46	20	46	38	37	65,368
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	66,216
1978	61	61	38	16	52	35	34	56,532

[1] "Crop Production", CrPr 2-2 (11-78), Crop Reporting Board, ESCS, USDA, November 9, 1978 and "Crop Production, 1977 Annual Summary", CrPr 2-1(78), Crop Reporting Board, ESCS. USDA, January 16, 1978.

Table 15--Fertilizer use on corn acreage harvested for grain, selected States, 1978

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 . . .	1,120	115	100.0	100.0	99.1	98.3	113.8	76.8	58.6	86.1	1.7	12.3
Michigan	2,150	91	97.8	97.8	96.7	93.4	111.8	70.7	89.5	61.8	0.0	38.2
Minnesota	6,100	160	95.0	94.4	89.4	90.0	89.5	51.3	63.2	85.5	1.3	13.2
Wisconsin	2,500	128	100.0	99.2	97.7	96.1	91.7	70.7	89.4	81.3	1.6	17.1
3 States	10,750	379	96.7	96.2	92.8	92.1	94.6	60.1	74.9	79.5	1.1	19.4
Illinois	10,000	221	97.3	96.8	94.6	91.0	140.0	84.6	98.8	66.4	1.4	32.2
Indiana	5,900	173	98.8	98.8	97.1	93.6	130.4	75.1	100.8	65.5	0.0	34.5
Iowa	12,100	198	93.4	93.4	85.4	82.3	130.0	66.3	73.0	83.8	4.3	11.9
Missouri	2,200	120	96.7	95.8	87.5	87.5	122.6	58.7	70.5	75.9	6.0	18.1
Ohio	3,570	145	98.6	98.6	95.9	93.8	132.9	85.7	91.9	72.0	0.7	27.3
5 States	34,470	857	96.3	96.1	91.5	88.6	133.1	75.4	88.2	73.5	2.6	23.9
Kansas	1,500	144	93.1	93.1	62.1	44.8	121.7	37.7	31.1	77.8	3.7	18.5
Nebraska	6,300	163	96.1	96.1	62.0	36.9	142.5	41.8	19.6	62.3	10.2	27.5
South Dakota . .	2,500	86	51.2	51.2	39.5	25.6	62.3	38.3	18.6	72.7	15.9	11.4
3 States	10,300	393	85.8	85.8	57.0	35.6	128.6	40.6	21.6	66.1	9.8	24.1
Kentucky	1,340	113	98.2	96.5	92.9	92.0	130.4	90.7	90.4	82.0	3.6	14.4
North Carolina .	1,540	107	100.0	100.0	97.2	98.1	155.6	65.3	91.9	17.7	5.6	76.7
Virginia	580	120	100.0	100.0	92.5	90.8	138.3	79.8	104.7	58.3	2.5	39.2
3 States	3,460	340	99.3	98.6	94.8	94.5	143.1	77.3	93.4	49.2	4.3	46.5
Georgia	1,400	91	100.0	98.9	98.9	97.8	138.5	56.3	89.2	8.8	1.1	90.1
Colorado	600	115	95.7	95.7	78.3	28.7	165.4	64.3	36.1	42.6	6.4	51.0
17 States . .	62,100	2,290	95.0	94.7	86.5	80.8	126.3	68.4	80.4	70.4	3.5	26.1

[1] "Crop Production" CrPr 2-2 (11-78) Crop Reporting Board, ESCS, USDA, November 9, 1978. [2] Percentages apply to acres receiving fertilizer.

1978 averaged about 77 pounds per acre, less than a year earlier. Application rates for phosphate and potash were up.

The decline in proportion of cotton acreage fertilized probably reflects the late planting conditions in Missouri and Arkansas, due to late spring rains, and drought conditions in Texas and Oklahoma. However, those cotton growers who did fertilize applied fertilizer at rates close to earlier years.

Soybeans for Beans: The 16 States surveyed for fertilizer use on soybeans for beans in 1978 accounted for 91 percent of U.S. harvested soybean acreage (table 17). The percent of acres receiving fertilizer increased as did acreage receiving nitrogen, phosphate, and potash. This is the fourth year in a row that the proportion of soybean acreage fertilized has increased.

The application rate of nitrogen used on soybeans was up 1 pound in 1978 to 17 pounds per acre. Phosphate use was the same at 45 pounds per acre, while potash application rates were up 2 pounds to 62 pounds.

The increased fertilizer application rates on soybean acreage probably reflected the more favorable price prospects for soybeans. Income prospects from soybeans have generally looked more favorable. Farmers have responded by applying more fertilizer.

All Wheat: The 17 States surveyed for fertilizer use on wheat in 1978 accounted for 92 percent of total U.S. acreage harvested for wheat (table 18). Of the fields surveyed, 61 percent received some fertilizer, down from 65 percent in 1977. The proportion of acres receiving nitrogen decreased along with the proportions receiving phosphate and potash. Application rates on wheat acreage harvested in 1978 were down for all three nutrients.

Generally, the proportion of wheat acreage fertilized and application rates were down or remained the same for winter wheat acreages in

Table 16—Fertilizer use on cotton acreage harvested, selected States 1978

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	180	66	97.0	90.9	87.9	93.9	44.2	48.2	51.1	82.8	7.8	9.4
Tennessee	240	97	96.9	96.9	94.8	94.8	73.8	69.4	74.3	83.0	2.1	14.9
Alabama	330	104	100.0	100.0	95.2	95.2	65.8	64.0	68.8	79.8	4.8	15.4
Georgia	115	63	100.0	100.0	100.0	100.0	77.6	59.7	93.4	20.6	0.0	79.4
2 States	445	167	100.0	100.0	95.6	95.6	66.9	63.6	71.2	74.3	4.4	21.3
Arkansas	780	245	94.3	93.1	61.6	74.3	63.6	41.7	50.1	67.5	8.2	24.3
Louisiana	505	123	100.0	99.2	81.3	81.3	78.0	47.6	49.3	61.8	13.0	25.2
Mississippi	1,150	348	99.4	98.6	36.2	37.9	92.0	54.4	58.7	61.0	14.2	24.8
3 States	2,435	716	97.9	96.9	53.7	58.6	80.3	47.6	52.5	63.2	12.4	24.4
Oklahoma	560	92	63.0	60.9	60.9	34.8	34.2	38.9	15.4	98.3	0.0	1.7
Texas	6,100	622	40.9	40.9	27.8	9.2	50.0	42.4	16.0	75.1	17.6	7.3
2 States	6,660	714	42.8	42.6	30.5	11.3	48.1	41.8	15.8	77.5	15.7	6.8
Arizona	572	103	89.3	89.3	37.9	1.0	134.9	52.5	26.0	0.0	63.0	37.0
California	1,455	275	96.2	95.8	39.3	8.0	119.7	81.1	66.5	35.7	34.5	29.8
11 States	11,987	2,138	69.1	68.7	45.3	31.3	76.2	53.6	53.7	62.8	17.9	19.3

[1] "Crop Production," CrPr 2-2(11-78) Crop Reporting Board, ESCS, USDA, November 9, 1978. [2] Percentages apply to acres receiving fertilizer.

Table 17—Fertilizer use on soybean acreage harvested for beans, selected States 1978

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*		
Minnesota	4,000	91	15.4	12.1	14.3	14.3	16.4	26.8	35.8	100.0	0.0	0.0
Illinois	9,200	95	18.9	9.5	17.9	18.9	13.8	50.3	84.8	100.0	0.0	0.0
Indiana	4,100	127	57.3	41.0	56.4	53.8	10.8	39.1	58.6	98.5	1.5	0.0
Iowa	7,500	141	12.8	9.9	12.8	12.8	11.0	33.1	39.2	94.4	5.6	0.0
Missouri	5,500	136	30.1	22.8	27.9	29.4	17.4	42.5	64.5	95.1	4.9	0.0
Ohio	3,720	112	40.2	33.0	38.4	39.8	14.5	42.0	52.0	100.0	0.0	0.0
5 States	30,020	611	27.3	19.3	26.3	26.6	13.5	41.9	62.0	97.9	2.1	0.0
Kansas	1,430	51	15.7	11.8	9.8	7.8	26.2	30.4	28.0	87.5	12.5	0.0
Nebraska	1,270	64	10.9	10.9	9.4	7.8	22.7	50.1	17.8	85.7	14.3	0.0
2 States	2,700	115	13.5	11.4	9.6	7.8	24.6	39.5	23.2	86.8	13.2	0.0
Kentucky	1,450	67	68.7	53.7	67.2	67.2	20.7	52.2	63.2	100.0	0.0	0.0
North Carolina	1,600	71	76.1	63.4	73.2	76.1	17.9	41.4	70.7	100.0	0.0	0.0
Tennessee	2,420	87	83.9	56.3	83.9	83.9	16.7	48.2	59.7	100.0	0.0	0.0
3 States	5,470	225	77.6	57.7	76.3	77.2	18.1	47.2	63.7	100.0	0.0	0.0
Georgia	1,700	70	88.6	74.3	87.1	88.6	20.9	41.7	69.1	95.2	4.8	0.0
Alabama	1,950	73	93.2	76.7	91.8	93.2	23.6	59.0	72.3	97.1	2.9	0.0
2 States	3,650	143	91.0	76.6	89.6	91.0	22.4	51.1	70.8	96.2	3.8	0.7
Arkansas	4,800	148	37.2	15.5	34.5	37.2	15.7	40.8	57.2	100.0	0.0	0.0
Louisiana	2,950	93	34.4	19.4	34.4	34.4	15.0	50.7	54.4	93.7	6.3	0.0
Mississippi	3,900	125	43.2	20.8	40.8	43.2	17.3	51.0	60.7	96.3	3.7	0.0
3 States	11,650	366	38.5	18.3	36.6	38.5	16.2	47.0	57.9	97.2	2.8	0.0
16 States	57,490	1,541	36.9	25.4	35.5	36.2	16.9	45.1	61.7	97.8	2.2	0.0

[1] "Crop Production," CrPr 2-2(11-78) Crop Reporting Board, ESCS, USDA, November 9, 1978. [2] Percentages apply to acres receiving fertilizer.

Table 18—Fertilizer use on all wheat acreage harvested, selected States 1978

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*		
Michigan	420	53	96.2	96.2	90.6	90.6	51.6	52.9	53.3	29.4	15.7	54.9
Minnesota	2,765	81	97.5	97.5	92.6	70.4	67.5	39.1	29.4	92.4	2.5	5.1
2 States	3,185	134	97.4	97.4	92.3	73.1	65.3	40.9	33.4	84.0	4.3	11.7
Illinois	950	75	93.3	92.0	76.0	50.7	56.8	69.2	68.8	30.0	18.6	51.4
Indiana	750	76	85.5	85.5	84.2	84.2	57.6	58.4	53.1	32.3	9.2	58.5
Missouri	840	80	96.2	96.2	76.2	76.2	52.9	45.6	53.7	50.7	26.0	23.3
Ohio	1,125	69	95.7	94.2	94.2	92.8	46.3	55.5	53.4	47.0	10.6	42.4
4 States	3,665	300	93.1	92.3	83.3	76.3	52.7	57.2	56.1	40.6	16.1	43.3
Kansas	10,300	285	63.5	62.8	30.2	6.3	50.2	30.2	18.0	77.9	8.3	13.8
Nebraska	2,600	119	46.2	46.2	13.4	1.7	42.7	38.5	7.0	81.8	12.7	5.5
North Dakota	9,300	268	60.1	58.2	54.5	9.7	33.1	25.6	13.0	99.4	0.0	0.6
South Dakota	3,055	102	20.6	20.6	18.6	5.9	24.4	21.6	6.3	95.2	4.8	0.0
4 States	25,255	774	55.3	54.3	36.0	7.0	41.6	27.4	14.0	87.6	5.2	7.2
Oklahoma	5,600	186	61.8	61.8	31.7	12.9	57.7	30.0	12.0	56.6	20.8	22.6
Texas	2,700	200	49.5	49.2	14.6	1.9	112.0	46.8	10.2	85.9	5.9	8.2
2 States	8,300	386	59.3	59.3	28.3	10.7	66.8	32.8	11.9	61.1	18.2	20.7
Colorado	2,382	90	11.1	11.1	0.0	0.0	39.6	0.0	0.0	90.0	10.0	0.0
Idaho	1,215	116	81.9	81.0	15.5	3.4	72.3	33.7	9.5	75.8	3.2	21.0
Montana	4,740	157	44.6	44.6	41.4	4.5	23.7	29.6	9.2	81.4	8.6	10.0
3 States	8,337	363	40.6	40.4	25.9	3.0	39.2	30.0	9.3	80.4	7.1	12.5
Oregon	1,190	92	71.7	71.7	9.8	3.3	67.3	48.2	37.3	57.6	16.7	25.7
Washington	2,760	149	96.0	96.0	9.4	.7	75.5	29.6	10.0	65.7	9.1	25.2
2 States	3,950	241	88.7	88.7	9.5	1.5	73.5	35.4	28.5	63.7	11.0	25.3
17 States	52,692	2,198	61.0	60.5	38.3	15.5	51.6	34.9	34.2	75.5	8.8	15.7

[1] "Crop Production," CrPr 2-2(11-78) Crop Reporting Board, ESCS, USDA, November 9, 1978. [2] Percentages apply to acres receiving fertilizer.

Southern Plains and Corn Belt regions. In the Northern areas—Northern Plains, Mountain, and Pacific regions—application rates, except for potash, were up or remained the same.

These fertilization patterns reflected weather and income prospects at the time of fertilizer application. In the southern winter wheat areas, uncertainty about wheat prices caused farmers to cut back on fertilizer use. In the North, especially the spring wheat areas, good weather conditions and more certain wheat price prospects encouraged farmers to use fertilizer.

U.S. IMPORT-EXPORT REVIEW

Value and Volume of Trade

Quantities and declared values of both imports and exports of major fertilizer products reached record levels in 1977/78 (tables 19, 20 and 21). More than 12.5 million metric tons of fertilizer valued at $851 million were imported by the United States during the last fertilizer year. These figures represent increases of about 5 percent in both volume and value over the previous year's imports. However, exports experienced even greater growth in 1977/78 with export volumes reaching nearly 23.3 million metric tons valued at almost $1.4 billion. There was a 29-percent growth in declared value of exports and a 24-percent increase in tonnage. These high export levels resulted in a half-billion-dollar favorable trade balance for fertilizer products in 1977/78.

Table 19—U.S. Fertilizer Exports: Declared values of selected materials, years ended June 30, 1975-78
(Million dollars)

Material	1975	1976	1977	1978[1]
Anhydrous ammonia	61.0	21.6	29.5	42.1
Urea	130.0	66.8	29.1	101.1
Ammonium nitrate	3.5	5.3	1.5	3.1
Ammonium sulfate	52.2	30.9	18.6	21.6
Sodium nitrate	.3	.1	.1	[2]2.4
Other nitrogen fertilizer	3.8	3.1	4.6	[3]2.6
Phosphate rock	371.1	420.8	319.9	370.4
Normal superphosphate	.8	.8	.2	2.9
Concentrated superphosphate	270.4	139.5	98.4	124.5
Ammonium phosphate	544.8	412.6	334.1	473.2
Phosphoric acid (fertilizer grade)	41.9	68.7	89.8	84.8
Other phosphatic fertilizer	4.7	5.0	5.3	4.3
Potassium chloride	56.4	70.6	63.1	66.1
Other potassic fertilizer	22.9	23.5	24.5	26.6
Mixed fertilizer	60.6	30.1	27.7	29.5
Total	1,624.4	1,299.4	1,046.5	1,355.2

[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.

Table 20—U.S. exports of selected fertilizer materials, years ended June 30, 1975-78
(1,000 metric tons material)

Material	1975	1976	1977	1978[1]
Anhydrous ammonia	277	231	264	475
Urea	450	527	334	832
Ammonium nitrate	22	56	10	22
Ammonium sulfate	572	682	445	355
Sodium nitrate	4	1	1	[2]17
Other nitrogen fertilizer	22	20	38	[3]22
Phosphate rock	13,393	10,657	11,574	14,097
Normal superphosphate	21	20	6	58
Concentrated superphosphate	1,104	1,111	1,127	1,290
Ammonium phosphate	2,242	2,469	2,857	3,682
Phosphoric acid (fertilizer grade)	232	282	403	682
Other phosphatic fertilizer	42	54	40	33
Potassium chloride	1,015	1,078	1,176	1,116
Other potassic fertilizer	350	302	317	424
Mixed fertilizer	497	198	203	176
Total	20,243	17,688	18,795	23,281

[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.

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

Table 21—U.S. imports of Selected fertilizer materials, years ended June 30, 1975-78
(1,000 metric tons material)

Material	1975	1976	1977	1978[1]
Anhydrous ammonia	598	696	878	956
Urea	812	479	1,330	1,240
Ammonium nitrate	316	268	315	387
Ammonium Nitrate-limestone	190	20	55	15
Ammonium sulfate	248	381	412	295
Sodium nitrate	202	81	126	133
Calcium nitrate	116	65	62	91
Nitrogen solutions	92	170	403	401
Other nitrogen fertilizer	109	117	103	159
Ammonium phosphates	247	308	351	311
Crude phosphates	80	32	51	725
Phosphoric acid	—	—	—	26
Normal + concentrated superphosphate	—	—	—	25
Other phosphatic fertilizer	199	91	96	48
Potassium chloride	6,359	5,866	7,449	7,452
Potassium sulfate	51	57	84	27
Potassium nitrate[2]	40	63	49	84
Other potassic fertilizer	2	3	—	6
Mixed and non-specific fertilizer	406	150	217	141
Total	10,067	8,847	11,981	12,522

[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.

Nitrogenous Fertilizer

On a nitrogen nutrient basis, 1977/78 fertilizer imports exceeded exports by approximately 290,000 metric tons (N). This is the second consecutive year that the United States experienced a positive nitrogen import balance and the third year in the last four. Imports of anhydrous ammonia and urea totalled about 1.36 million metric tons of nitrogen and represented 74 percent of nitrogen imported. These same products accounted for 50 percent of nitrogen exports but total only .77 million metric tons of nitrogen. Ammoniated phosphates accounted for an additional 42 percent of nitrogen exports.

While nitrogen imported as ammonia increased by about 9 percent in 1977/78, total nitrogen nutrients imported increased by only 1 percent. The increased ammonia imports were largely offset by decreased urea, ammonium sulfate, and diammonium phosphate imports. On the other hand, exports of nitrogen nutrients increased by over one-half million metric tons, or 53 percent. This impressive growth was led by urea, anhydrous ammonia, and diammonium phosphate which registered increased nitrogen nutrient exports of 149 percent, 82 percent, and 32 percent respectively.

Nitrogen Imports

Canada continues to be our largest foreign nitrogen supplier, accounting for 54 percent of the total import tonnage of anhydrous ammonia, urea, ammonium sulfate, and ammonium nitrate. Relatively abundant natural gas supplies, ample modern production facilities, and proximity to and experience with the U.S. market are all factors which account for this predominance in the U.S. nitrogen import market. Canada will continue to be an important source of nitrogen, but its increasing domestic demand for fertilizer and natural gas along with competition from lower cost producers may eventually erode its prominence in U.S. trade.

Other traditional suppliers of large quantities of imported nitrogen products are the Netherlands and Trinidad and Tobago. The Netherlands shipped 19 percent of U.S. ammonia, urea, ammonium nitrate, and ammonium sulfate imports in 1977/78 but its share declined from the previous year. Trinidad and Tobago supplies another 7 percent of those imports with ammonia imports from that country increasing to over 209,000 metric tons. With new nitrogen plants under construction and plentiful supplies of offshore gas, Trinidad and Tobago can be expected to increase nitrogen exports to the United States. The Dutch share of U.S. nitrogen trade is likely to continue its decline as lower cost producers penetrate the U.S. market.

Important newcomers to the U.S. nitrogen import market are Mexico and the USSR. Ammonia imports from these nations during 1977/78 amounted to about 110,000 metric tons each. Less than 40,000 metric tons were imported from Mexico in 1976/77 and no ammonia had previously arrived from the Soviet Union. Both countries have announced intentions to substantially increase their ammonia exports to the United States in 1978/79.

Nitrogen Exports

Exports of nitrogen in nutrient terms in 1977/78 amounted to over 1.5 million metric tons—a growth of 53 percent over the previous year. In descending order of nutrients exported, ammoniated phosphates, anhydrous ammonia, and urea exports together accounted for 92 percent of total nitrogen shipped abroad.

Ammoniated phosphate exports increased by nearly 29 percent in 1977/78. These contained nearly two-thirds of a million tons of nitrogen, mostly in the form of diammonium phosphate (DAP). Forty-five countries received shipments of U.S.-made DAP in 1977/78 making this product the mostly widely distributed upgraded fertilizer export. Furthermore, DAP exports tallied the highest value of any fertilizer. Only phosphate rock tonnages exceeded the volume of this product. Five countries—Italy, India, Brazil, and Belgium-Luxembourg—imported 55 percent of U.S. DAP exports.

Brazil, the United Kingdom, and Italy were the destinations of over half of 1977/78 overseas anhydrous ammonia shipments which increased by nearly 80 percent that year. Urea exports increased nearly 150 percent due in large part to massive increases in U.S. exports to India, Brazil, and the People's Republic of China. Urea exports to those three countries more than tripled last year and their combined shipments totalled 70 percent of U.S. urea exports. Part of the reason for the quadrupling of U.S. urea imports by India was that country's decision to build up stockpiles of that important fertilizer.

Phosphate Fertilizers and Phosphate Rock

The United States was again a major exporter of phosphate fertilizers and phosphate rock in 1977/78. Exported phosphate nutrients climbed 24 percent to nearly 7.3 million metric tons of P_2O_5. Although imports also increased, net phosphate nutrient exports increased to almost 6.9 million metric tons. Most phosphates were exported in the form of phosphate rock and diammonium phosphate, accounting for 64 percent and 20 percent of phosphate nutrient exports, respectively.

Phosphate rock was exported to 42 countries. Nearly half, however, went to the four countries which imported more than a million metric tons each—Canada, France, Korea, and Japan. Particularly large increases in exports of phosphate rock to Canada and Korea were noted.

Exports to Canada increased by 26 percent to over 2.9 million metric tons of rock. Korea took over 1.5 million metric tons, a 130-percent increase. The increase in rock exports to Canada can be attributed to increased domestic fertilizer shipments in that country. Canadian phosphate shipments increased 15 percent in 1977/78 with most of the growth in the western provinces. Korea's impressive growth in phosphate rock imports can be linked to the opening of several large-scale, export-oriented fertilizer complexes which include DAP production facilities.

As noted previously in the discussion of nitrogen exports, DAP exports increased significantly in 1977/78. The phosphate nutrient content of DAP exports rose to almost 1.5 million metric, a 30-percent increase.

Other important phosphate products which registered export gains are concentrated superphosphate and phosphoric acid. The largest customer for these products is Brazil, although

there was no growth in Brazilian imports of concentrated superphosphate and a small decline in that country's purchase of phosphoric acid. This apparent stagnation is largely due to more stringent import quotas in Brazil which are intended to stimulate domestic production. South African exports to Brazil may also have an impact upon growth of U.S. phosphate exports to that country. Other important importers of phosphoric acid are Canada and India. Indonesia, the Federal Republic of Germany, and other Western European nations are other large importers of U.S. concentrated superphosphates.

Although phosphate imports are of a much lower magnitude than exports, imported phosphate nutrients rose by 74 percent in 1977/78 to over 400,000 metric tons of P_2O_5. This increase was primarily due to the importation of over 560,000 metric tons of Moroccan phosphate rock. This trade was a new development in 1977/78 since only negligible amounts of Moroccan rock had been previously imported. Apparently, one U.S. firm imported most of the Moroccan product.

Potash

In 1977/78 enough potassium materials were imported to account for 92 percent of domestic agricultural consumption of K_2O. Imports of Canadian potassium chloride alone amounted to 85 percent of total U.S. potassium nutrient consumption that year. Levels of U.S. potassium nutrient imports and exports were virtually unchanged in 1977/78 compared with the previous year; net imports during both years amounted to 3.7 million metric tons. Potassium chloride was by far the most important potash product imported, accounting for 98 percent of potassium nutrients entering the country.

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT FERTILIZER PROGRAM

Commitments to finance fertilizer purchases of developing nations made by the U.S. Agency for International Development (AID) amounted to over 350,000 metric tons of materials, worth over $75 million (cost & freight basis) in fiscal year 1978 (table 22). This represents a sharp increase in both tonnage and value over 1977, although the totals still do not approach the higher levels prevailing when Vietnam was a major recipient of fertilizer assistance in 1975 and earlier.

Much of the 67-percent increase over 1976/77 in quantity financed is the result of large commitments to Bangladesh. That country is to purchase 275,500 metric tons of AID-financed fertilizer, 78 percent of 1978 commitments. Other countries receiving commitments in fiscal year 1978 were Haiti, Niger, Zambia, and the Sudan.

Actual disbursements of fertilizer during fiscal year 1978, which were the result of previous AID commitments, totaled around 233,000 metric tons valued at over $34.5 million (f.o.b.). Again, Bangladesh was the major beneficiary of the program receiving nearly 150,000 metric tons of fertilizer, about 64 percent of the total. Other recipients were Haiti, Zaire, and Zambia.

Fertilizer materials of U.S. origin represent 69 percent of total commitments in 1978 and 72 percent of disbursements. These proportions are lower than those of 1975/76 and 1976/77, but are much higher than 1974/75 when fertilizers from foreign sources comprised about two-thirds of AID-sponsored purchases due to tight domestic supplies. AID-financed fertilizer exports represent a small portion of U.S. exports of similar materials. AID

Table 22—U.S. Agency for International Development Commitments to Finance Fertilizer Purchases by Developing Countries for years ended June 30, 1976-77 and September 30, 1978

Fertilizer	1976		1977		1978	
	Quantity	Amount	Quantity	Amount	Quantity	Amount
	1,000 metric tons	*1,000 dollars*	*1,000 metric tons*	*1,000 dollars*	*1,000 metric tons*	*1,000 dollars*
Ammonium sulfate	2.0	137.4	---	---	neg.	4.3
Diammonium phosphate	202.3	27,313.9	174.9	22,182.2	60.0	14,321.3
Urea	94.7	15,118.5	32.1	4,165.0	156.5	30,659.9
Concentrated superphosphate	111.5	11,943.6	.5	55.0	70.4	13,174.5
Potassium chloride	---	---	.1	17.6	---	---
Mixed fertilizer	13.8	1,720.2	2.6	448.3	64.7	16,976.2
Total	424.3	56,233.6	210.2	26,868.1	351.6	75,136.2

Source: U.S. Dept. of State. Agency for International Development.

disbursements of U.S. manufactured materials accounted for less than 2 percent of total U.S. exports of those same materials during FY 1978.

AID commitments to finance fertilizer purchases are expected to increase in fiscal year 1979 to about 364,000-414,000 metric tons. Countries which are under consideration for assistance are Bangladesh, Sri Lanka, India, Pakistan, Liberia, Zambia, and Niger. Small procurements for other African nations are also possible. In addition to direct fertilizer purchases, some AID agricultural development projects include fertilizer promotion components, particularly in Latin America, but also in Afghanistan and Tunisia.

Other AID fertilizer assistance involves participating in the financing of fertilizer production facilities. AID and other donors are helping to fund the planning and construction of the Dead Sea potash extraction project in Jordan, the Ashuganj urea facility in Bangladesh, and the Fauji Fertilizer Factory in Pakistan. Furthermore, AID provides financial assistance to the International Fertilizer Development Center (IFDC) in support of research and development activities aimed at developing improved fertilizer products and better ways for developing countries to produce fertilizer from their own resources.

WORLD FERTILIZER SITUATION REVIEW AND PROSPECTS

1977/78 Consumption

Preliminary estimates of 1977/78 world fertilizer consumption indicate that record quantities of nitrogen, phosphate, and potash were applied to the world's crops during the just completed fertilizer year. Global consumption of plant nutrients in 1977/78 increased around 5 percent to just under 100 million metric tons of total N, P_2O_5, and K_2O despite a slow year in the United States (table 23).

Table 23—World Consumption of Fertilizer 1976/77 and 1977/78

(Million metric tons of nutrient)

Nutrient	Actual 1976/77	Estimate 1977/78
N	45.09	47.93
P_2O_5	26.49	27.61
K_2O	23.06	23.98
Total	94.64	99.52

Source: Actual, FAO
Estimate, FAO/UNIDO/World Bank Fertilizer Working Group, June, 1978.

1977/78 Prices

International fertilizer prices experienced a long decline from the unsustainably high levels of 1974 and 1975 until they hit bottom during 1976/77. In 1977/78, seasonal fluctuations continued, especially for triple superphosphate, diammonium phosphate, mixed fertilizer, and ammonia. However, when price levels are compared for both the beginning and end of 1977/78, prices prove to be stronger or more stable than in other recent years. As demonstrated by figure 2, nominal prices of most fertilizers were either higher or about the same in July 1978 versus July 1977 with the exception of ammonia which experienced a 5- to 6-percent decline owing to worldwide excess capacity. Prices remained extremely steady for potassium chloride and mid-year prices for diammonium phosphate and triple superphosphate were about the same in both 1977 and 1978. Prices rose for ammonium sulfate, urea, phosphoric acid, and 15-15-15 compound fertilizer. Phosphoric acid prices climbed about one fifth, the strongest increase, while urea prices rose 12-13 percent. Strong demand and limited supply capacity at current prices for these upgraded products have boosted their price.

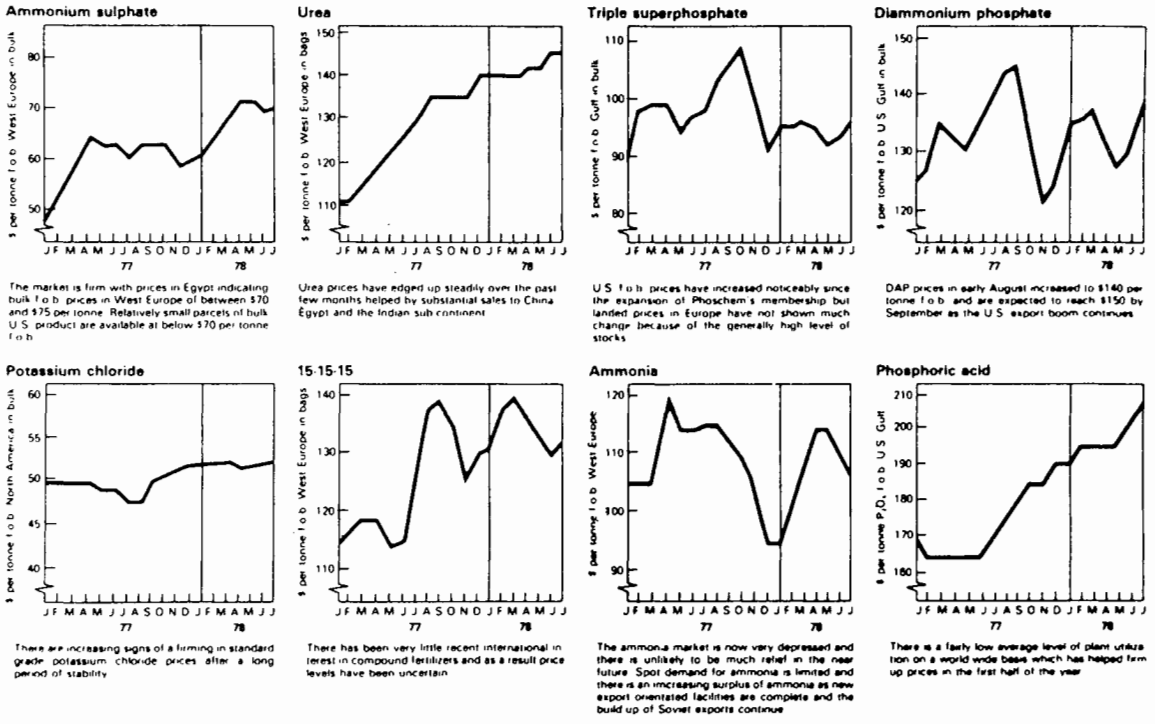
Recent Prices

World export prices of phosphate and potash fertilizers showed moderate strengthening during fall 1978. Nitrogen prices remained steady, then strengthened slightly (table 24). Phosphate and potash prices this winter are likely to be supported by strong world-wide demand. Nitrogen prices are likely to remain near current low levels owing to continued excess ammonia production capacities. Supplies are generally adequate to meet growing world-wide demand for fertilizers.

Regional Cooperation

A new regional, multi-national fertilizer importing company was initiated in October when 11 Latin-American nations approved the establishment of Multifert S.A. Initially, the company would coordinate the member nations' imports of fertilizer valued at about one-third billion dollars and promote regional production.

International Price Trends for Principal Fertilizers



Source: British Sulphur Corporation, Fertilizer International, No. 111, Sept. 1978, p. 4. USDA Neg. ESCS 3153-78 (10)

Figure 2

Table 24—Recent international export prices for selected fertilizer products

Product	1977	1978				
	September	July	August	September	October	November
	US$/metric ton					
Urea (bagged) f.o.b. Western Europe	130-145	140-150	145-150	145-150	145-155	150-155
Ammonium sulphate f.o.b. Japan	60-70	70-80	70-80	70-80	70-80	75-80
Diammonium phosphate f.o.b. US Gulf	145-150	137-142	142-144	145-150	150-155	150-153
Triple superphosphate f.o.b. US Gulf	105-110	97-100	102-103	104-105	103-106	99-103
Potassium chloride (muriate) f.o.b. Vancouver	45-55	52-60	52-60	57-62	55-64	61-65

Source: FAO and World Bank

Nitrogen

While Western Europe, Japan, and the United States continue to be troubled by excess ammonia production capacities, new entrants to the nitrogen export market are experiencing success in selling increasing amounts of ammonia. Ammonia plant closings are not only affecting the United States. For example, Japan has begun to "rationalize" her nitrogen industry by reducing ammonia and urea capacities by 20 percent and 40 percent, respectively. In contrast, new production facilities in the USSR, Mexico, Trinidad and Tobago, and elsewhere are contributing significantly to increased world nitrogen export supplies.

Both Mexico and the Soviet Union have elected to make use of their abundant natural gas supplies by using that resource as a feedstock for ammonia production. Major production capacity expansions have already come on-stream in both countries and additional facilities are already under construction or planned. Since both countries produce both gas

and ammonia in state-owned facilities, they have priced their gas at rates well below prevailing world market rates. This low cost gas enables them to offer ammonia on the world market at very competitive prices despite high transportation costs.

Mexico, until recently a net importer of ammmonia, is expected to export around 600,000 metric tons of the product in 1979 with around 40 percent of that earmarked for the United States and the rest divided about equally between Western Europe and Latin America. The Soviet Union has entered into long-term, barter-type arrangements with Western nations to export even larger quantities of ammonia, urea, and potash. Soviet export contracts with firms in countries such as the United States, Italy, the Netherlands, France, Japan, Finland, and West Germany are expected to reach nearly 700,000 metric tons of ammonia in 1978, climbing to as much as 3 million metric tons by 1980.

Phosphate

World phosphate supplies will be augmented due to several recent developments. A major new phosphate rock mine opened ahead of schedule in Florida in October and the Bu Craa mine in the former Spanish Sahara is expected to resume normal operations by year's end after nearly a three-year shutdown resulting from guerrilla sabotage of the conveyor belt to the port. Future expansions in Morocco, Jordan, and Senegal are also scheduled to supply the world export market.

Faced with rapid phosphate consumption growth which exceeds production expansion, the USSR has sought alternative sources of phosphatic materials and has concluded a massive fertilizer exchange agreement with a U.S. company and has also agreed to help finance and develop major new deposits in Morocco. Florida superphosphoric acid will be exchanged for Soviet ammonia, urea, and potash for a twenty-year period in one of the world's largest trade agreements. The first shipment of Florida superphosphoric acid to the USSR arrived in late 1978.

Morocco and the USSR have agreed to jointly develop a major new phosphate rock-mining area near Meskala including building a railroad to the port. The Soviets have recently reported the discovery of potentially major phosphate rock deposits along a new railroad route in Siberia. Plans to develop some of the Siberian phosphate resources have also been announced.

Poland has concluded a long-term agreement to exchange one-half million metric tons of sulfur for one million metric tons of Florida phosphate rock annually. The Polish sulfur would be used in making superphosphoric acid for shipment to the USSR.

A relatively new development involving phosphate rock is the recent construction of and planning for commerical facilities to reclaim uranium oxide from phosphoric acid. The product is used in the manufacture of fuel for nuclear power plants. The added value of this byproduct could make the exploration of lower grade phosphate rock deposits more commerically feasible, thus increasing economically recoverable reserves. Production facilities for reclaiming uranium oxide are already under construction or planned in the United States, France, Israel, Yugoslavia, and Canada.

Potash

Canada's Potash Corporation of Saskatchewan (PCS) has, through acquisition of several existing mines, succeeded in becoming the largest producer of potash outside of the USSR. Planned expansions at all three of its wholly owned mines will increase the company's share of Saskatchewan's potash production capacity to about 50 percent. However, announcements during the last year by two competitors of their intentions of opening new mines in New Brunswick may challenge the supremacy of PCS in Canada during the 1980's.

Despite weak U.S. demand in 1977/78, total sales of North American-produced potash increased slightly due to a 24-percent increase in overseas exports, especially to Brazil, Japan, and India. Overseas demand for North American potash is even stronger this year evidenced by the 9-percent increase in exports registered during the July-September 1978 quarter compared with a year earlier. Canadian potash producers have recently contracted to export 300,000 metric tons of muriate of potash to the People's Republic of China between October 1978 and June 1979. This is the largest sale ever made to China. The 1978/79 fertilizer year could be a record sales year for North American potash producers and prices could increase moderately.

Plans for additional potash production facilities outside of North America will result in still further world potash supplies. Brazil has provisionally arranged for a French government loan to help finance a potash mine and refinery complex in Sergipe state. The 1-million-metric-ton/year facility may be operational as early as 1981 and could eventually supply over half of Brazil's projected domestic potash requirements.

Israel has also announced plans to construct an additional 600,000-metric-ton/year potash facility on the Dead Sea. The production would supply the growing world export market. Jordan is also building a potash facility on the opposite shore of the Dead Sea.

WORLD SUPPLY-DEMAND PROJECTIONS TO 1982/83[2]

World fertilizer supply capability should be adequate to meet world demand through 1982/83, although surplus supply capabilities for phosphates and potash are expected to decline through that year (appendix tables 1, 2 and 3).

Demand

Global fertilizer consumption will continue growing while the world's population increases and government policies aimed at expanding food production promote increased fertilizer use. Such policies are particularly evident today in developing and centrally planned countries.

World demand for fertilizer during the 1977/78 through 1982/83 period is projected to grow at annual compound rates of 6 percent for nitrogen, 6.3 percent for phosphate, and 5.1 percent for potash (table 25). In the latter year, nitrogen demand is expected to reach 64 million metric tons while phosphate and potash demand should amount to about 38 million and 31 million, respectively.

Table 25—Projected world demand growth for fertilizer 1977/78-1982/83

(compound annual growth rates)

Nutrient	Developed market economies	Developing market economies	Centrally planned economies	Total world
	Percent			
N	3.7	9.2	5.5	6.0
P_2O_5	2.3	7.9	10.0	6.3
K_2O	3.9	8.5	5.6	5.1

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June, 1978.

The slowest growth in demand for all nutrients is foreseen in the developed market economies. Demand for plant nutrients in the centrally planned economies is projected to grow faster, especially for phosphates. This strong growth for phosphates is primarily the result of plans by the USSR to emphasize increased utilization of phosphate fertilizers. Developing market economies are expected to experience the fastest growth for nitrogen and potash[3] and, also, a strong growth for phosphates.

Perhaps the most impressive projected increase is the nearly 10-percent annual growth in use of nitrogen in the Far East. India, for example, expects to more than double its 1976/77 nitrogen consumption by 1982/83 when consumption is projected to exceed 5 million metric tons of nutrient. In that year India will account for nearly a third of the nitrogen consumption in developing countries.

The differences in fertilizer demand growth rates among the world's regions are expected to result in some significant changes in world fertilizer consumption patterns by 1982/83 (table 26).

Table 26—Changes in regional shares of world fertilizer consumption, 1976/77-1982/83

(percent[1])

	N	P_2O_5	K_2O
Developed market economies			
1976/77	44	50	50
1982/83	38	41	46
Centrally planned economies			
1976/77	36	33	41
1982/83	39	39	42
Developing market economies			
1976/77	20	17	9
1982/83	24	20	12

[1] Totals may not equal 100 due to rounding.

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June 1978.

Centrally planned and developing countries are expected to increase their shares of world consumption of all nutrients while developed Western nations decrease their portion of world fertilizer use. The largest shift in consumption is observed in phosphates where the developed market economies' share of world consumption is projected to drop 9 percentage points by 1982/83. Rapid phosphate consumption increases in the centrally planned economies and developing market economies will lead to share increases of 6 and 3 percentage points, respectively. Again, projected growth in phosphate consumption in the USSR is the most significant factor raising the share of the centrally planned countries. The greatest share gains in nitrogen are those of the developing regions, particularly in the Far East. Potash consumption patterns exhibit the least change with the largest growth in world consumption shares registering in Latin America and the Far East.

[2] The following discussion and tables 25, 26, 27, 28, and appendix tables 1, 2 and 3 are based upon projections made by the FAO/UNIDO/World Bank Fertilizer Working Group at its June 1978 meeting.

[3] Potash use in developing countries is growing from a small base.

Supply Capability

Growth in supply capability is expected to meet the world's expanding fertilizer demands through 1982/83. However, the rates of supply expansion are slower than the rates of demand expansion, particularly for phosphate and potash (table 27). 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, especially for phosphate and potash.

Table 27—Projected growth in world supply capability for fertilizer, 1977/78-1982-83

(compound annual growth rates)

Nutrient	Developed market economies	Developing market economies	Centrally planned economies	Total world
	Percent			
N	2.6	14.9	8.5	5.7
P_2O_5	.8	13.1	7.3	4.6
K_2O	1.9	([1])	5.7	3.7

[1] Potash supply capability in developing market economies was negligible in 1977/78.

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June 1978.

By 1982/83, world supply capabilities are projected to increase to nearly 68 million metric tons for nitrogen nutrients, almost 4 million metric tons for phosphate nutrients, and about 34 million metric tons for potash nutrients.

Supply capability is forecast to expand most slowly in the developed market economies and most rapidly in developing economics.

The most rapid growth in nitrogen supply capabilities will take place in the Far East, Near East, and the USSR. India's nitrogen production capacity increases play a central role in the Far East situation. Nitrogen capacity expansion in the Middle East will double that region's share of world production in 6 years to total nearly 5 percent of world supply capability. Although the Middle East's share of world nitrogen production capability is expected to remain relatively small in 1982/83, its potential due to its vast natural gas resources is obvious. Expanded Soviet nitrogen capacity will meet both domestic and export requirements.

Phosphate fertilizer production capability in developing countries is expected to grow by 163 percent between 1976/77 and 1982/83. Expansions in all developing regions will enable Africa, Latin America, and the Near East to each enjoy 5 percent of world phosphate production capability while the Far East will possess 4 percent.

By 1982/83 the developed nations' share of world phosphate and nitrogen supply capability will decline by about 8 percentage points because of nitrogen expansions in the centrally planned states and expansions in both nitrogen and phosphate capabilities in developing countries. Potash production shares remain virtually unchanged during the period. Over four-fifths of all potash production expansion is slated for the two current leaders, Russia and Canada (table 28).

Table 28—Changes in regional shares of world fertilizer supply capability, 1976/77-1982/83

(percent[1])

	N	P_2O_5	K_2O
Developed market economies			
1976/77	48	57	52
1982/83	40	49	52
Centrally planned economies			
1976/77	39	32	47
1982/83	42	32	48
Developing market economies			
1976/77	13	11	1
1982/83	19	19	1

[1] Totals may not equal 100 due to rounding.

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June 1978.

World Fertilizer Trade Implications

Nitrogen

The world surplus in nitrogen supply capability is projected to continue growing until 1981/82, reaching nearly 4.4 million metric tons of nutrient before beginning to moderately decline to 3.6 million metric tons in 1982/83.

Between 1976/77 and 1982/83, one region, the Near East, will shift from being a net importer of nitrogen to a modest, but growing net exporter.[4] Of the other net importing regions, only Latin America is expected to experience significant growth in net import requirements, while in the Far East, Africa, and Communist Asia import requirements will remain relatively stable. The net import requirement of the developing countries as a group will actually decline by about 23 percent during this period.

The surplus nitrogen supply capability of Eastern Europe, including the USSR, will increase about 87 percent during the same period, growing

[4] As a region, the Near East would be an even larger net exporter but Turkey will continue to import large quantities of nitrogen, possibly through intra-regional trade.

to almost 4.7 million metric tons of nutrient. Much of the additional Eastern European capacity was built specifically to supply the export market. Abundant natural gas, priced by the state at prices below world market levels, will make Russian and Eastern European nitrogen fertilizer products highly competitive in the world market.

Developed Western nations will continue to be troubled by surplus nitrogen production capacities. Oceania will continue to be virtually self-sufficient. Japan and South Africa as a group will maintain a more or less constant surplus of about three-fourths of a million metric tons of nitrogen. In North America and Western Europe, surplus supply capability will continue growing until peaking in 1979/80. After peaking, the surplus nitrogen capability of North America will return to 1976/77 levels of about one-half million metric tons in 1982/83. Western Europe will be bothered with higher levels of excess capacity in 1982/83, about 1.4 million metric tons.

With the Near East and Eastern Europe expanding their export networks in a slowly growing world nitrogen trade market, the high cost feedstock producers in North America, Western Europe, and Japan will likely face continued loss of market shares and may be forced to idle or close even more nitrogen facilities.

Phosphate

By 1982/83, the centrally planned economies will move from self-sufficiency in phosphate fertilizers (1976/77) to requiring around 1.5 million metric tons of imported phosphate nutrients, mostly in Eastern Europe. During the same period the developing countries as a group will shift from requiring about 1.5 million metric tons of imported phosphates to self-sufficiency with a modest surplus capability. This change will be the result of capacity expansions in North and West Africa and the Near East. North America and Western Europe will witness the steady, moderate reduction of their phosphate supply capability surpluses after 1977/78, but will have no difficulty in supplying projected increases in phosphate import demands of Latin America, the Far East, Communist Asia, and Eastern Europe.

World excess phosphate supply capability will be nearly halved between 1977/78 and 1982/83, a trend which could lead to tight world supplies shortly after that date unless appropriate new investment decisions are made soon.

Potash

The potash import requirements of the developing nations as a group are projected to double between 1976/77 and 1982/83 to over 3.6 million metric tons of nutrient. The growth is predominantly foreseen in Latin America and the Far East. Expected large consumption increases in Brazil, Mexico, India, Korea, and Malaysia figure prominently in those expectations.

The surplus production capacities of North America and Eastern Europe will remain adequate to supply the growing needs of the deficit regions but potash mining capacity must be continuously expanded or world demand will outstrip supplies shortly after 1982/83. Surplus world potash production capability is projected to dwindle from about 2 million metric tons of potential surplus in 1977/78 to just 0.4 million metric tons in 1982/83.

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

(million metric tons of nutrients)

Region	Actual	Forecast					
	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
North America							
Supply capability	10.75	11.32	11.95	12.57	12.82	12.92	12.96
Consumption	10.26	10.12	10.77	11.17	11.56	11.94	12.40
Surplus (-deficit)	0.49	1.20	1.18	1.40	1.26	0.98	0.56
Western Europe							
Supply capability	9.59	10.11	10.50	10.81	11.08	11.36	11.51
Consumption	8.42	8.66	8.86	9.14	9.44	9.71	10.12
Surplus (-deficit)	1.17	1.45	1.64	1.67	1.64	1.65	1.39
Oceania							
Supply capability	0.22	0.20	0.21	0.21	0.23	0.25	0.26
Consumption	0.23	0.24	0.24	0.26	0.27	0.29	0.30
Surplus (-Deficit)	-0.01	-0.04	-0.03	-0.05	-0.04	-0.04	-0.04
Other developed market economies							
Supply capability	1.53	1.87	1.92	1.95	1.99	2.02	2.03
Consumption	1.08	1.14	1.18	1.21	1.25	1.28	1.32
Surplus (-deficit)	0.45	0.73	0.74	0.74	0.74	0.74	0.71
Total developed market economies							
Supply capability	22.09	23.50	24.58	25.54	26.12	26.55	26.76
Consumption	19.99	20.16	21.05	21.78	22.52	23.22	24.14
Surplus (-deficit)	2.10	3.34	3.53	3.76	3.60	3.33	2.62
Africa							
Supply capability	0.16	0.21	0.23	0.26	0.31	0.34	0.37
Consumption	0.52	0.55	0.62	0.67	0.72	0.77	0.82
Surplus (-deficit)	-0.37	-0.34	-0.39	-0.41	-0.41	-0.43	-0.45
Latin America							
Supply capability	1.32	1.38	1.49	1.67	1.87	2.05	2.28
Consumption	2.27	2.48	2.69	2.92	3.15	3.39	3.65
Surplus (-deficit)	-0.96	-1.10	-1.20	-1.25	-1.28	-1.34	-1.37
Near East							
Supply capability	1.04	1.24	1.61	1.89	2.35	2.97	3.31
Consumption	1.04	1.73	1.86	2.04	2.23	2.33	2.66
Surplus (-deficit)	-0.60	-0.49	-0.25	-0.15	0.12	0.53	0.65
Far East							
Supply capability	3.21	3.58	4.53	5.36	6.11	6.39	6.85
Consumption	4.34	5.01	5.77	6.31	6.84	7.43	8.04
Surplus (-deficit)	-1.13	-1.43	-1.24	-0.95	-0.73	-1.04	-1.19
Total developing market economies							
Supply capability	5.72	6.41	7.86	9.18	10.64	11.75	12.81
Consumption	8.77	9.77	10.94	11.94	12.94	14.03	15.17
Surplus (-deficit)	-3.05	-3.36	-3.08	-2.76	-2.30	-2.28	-2.36
Communist Asia							
Supply capability	4.12	4.21	4.49	4.87	5.34	5.85	6.11
Consumption	5.01	5.73	5.90	6.26	6.68	7.13	7.43
Surplus (-deficit)	-0.89	-1.52	-1.41	-1.39	-1.34	-1.28	-1.32
Eastern Europe							
Supply capability	13.95	14.47	15.76	16.83	18.64	20.86	22.02
Consumption	11.28	12.27	13.24	14.21	15.24	16.28	17.37
Surplus (-deficit)	2.67	2.20	2.52	2.67	3.40	4.58	4.65
Total centrally planned economies							
Supply capability	18.07	19.68	20.25	21.75	23.98	26.71	28.13
Consumption	16.29	18.00	19.14	20.47	21.92	23.41	24.80
Surplus (-deficit)	1.78	0.68	1.11	1.28	2.06	3.30	3.33
World Total							
Supply capability	45.88	48.59	52.69	56.47	60.74	65.01	67.70
Consumption	45.05	47.93	51.13	54.19	57.38	60.66	64.11
Surplus (-deficit)	0.83	0.66	1.56	2.28	3.36	4.35	3.59

[1] Supply forecasts are for maximum *supply capabilities* except that some production cuts announced by the producers have been taken account of, e.g., in North America and particularly in Japan (other developed). Forecast supply capabilities are based on existing and announced new ammonia capacity. Capacity utilization in ammonia units is based on past experiences on a country-by-country basis. Non-fertiliser uses amounting to about 15% on average, have been deducted, as well as losses, 5% in primary production and 5% in secondary, down-stream production and distribution. For new capacities coming on stream, the escalation of capacity utilization is assumed to be from 20% of final average capacity utilization during the first six months to 70% during the following 18 months, whereafter the country average utilization rate is assumed to have been reached.

Source: Actual: FAO
Forecast: FAO/UNIDO/World Bank Fertilizer Working Group, June 1978.

Appendix table 2–World phosphate fertilizer supply capabilities, demand and balances[1]

(million metric tons of nutrients)

Region	Actual	Forecast					
	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
North America							
Supply capability	7.80	8.93	9.03	9.03	9.03	9.04	9.05
Consumption	5.64	5.49	5.69	5.89	6.03	6.18	6.30
Surplus(-deficit)	2.16	3.44	3.34	3.14	3.00	2.86	2.75
Western Europe							
Supply capability	5.69	7.19	7.26	7.35	7.46	7.52	7.52
Consumption	5.47	5.51	5.71	5.88	6.03	6.19	6.35
Surplus (-deficit	0.22	1.68	1.55	1.47	1.43	1.33	1.17
Oceania							
Supply capability	1.08	1.25	1.26	1.31	1.36	1.38	1.41
Consumption	1.13	1.26	1.27	1.32	1.37	1.40	1.43
Surplus (-deficit)	-0.05	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02
Other developed market economies							
Supply capability	1.04	1.75	1.81	1.79	1.84	1.87	1.87
Consumption	1.12	1.13	1.15	1.18	1.20	1.25	1.29
Surplus (-deficit)	-0.08	0.62	0.66	0.61	0.64	0.61	0.58
Total developed market economies							
Supply capability	15.61	19.12	19.36	19.48	19.69	19.81	19.85
Consumption	13.36	13.39	13.82	14.27	14.63	15.03	15.37
Surplus (-deficit)	2.25	5.73	5.54	5.21	5.06	4.78	4.48
Africa							
Supply capability	0.43	1.33	1.37	1.47	1.77	1.99	2.05
Consumption	0.42	0.45	0.48	0.52	0.56	0.60	0.65
Surplus (-deficit)	0.01	0.88	0.89	0.95	1.21	1.39	1.40
Latin America							
Supply capability	1.16	1.17	1.18	1.21	1.45	1.85	2.03
Consumption	1.89	2.14	2.21	2.43	2.66	2.90	3.13
Surplus (-deficit)	-0.73	-0.97	-1.03	-1.22	-1.21	-1.05	-1.10
Near East							
Supply capability	0.58	0.65	0.79	0.99	1.55	1.94	2.05
Consumption	0.93	0.94	1.01	1.09	1.18	1.28	1.38
Surplus (-deficit)	-0.35	-0.29	-0.22	-0.10	0.37	0.66	0.67
Far East							
Supply capability	0.78	1.04	1.19	1.38	1.41	1.55	1.64
Consumption	1.24	1.65	1.73	1.97	2.08	2.25	2.42
Surplus (-deficit)	-0.46	-0.61	-0.54	-0.59	-0.67	-0.70	-0.78
Total developing market economies							
Supply capability	2.95	4.19	4.53	5.05	6.18	7.33	7.77
Consumption	4.48	5.18	5.43	6.01	6.48	7.03	7.58
Surplus (-deficit)	-1.53	-0.99	-0.90	-0.96	-0.30	0.30	0.19
Communist Asia							
Supply capability	1.64	1.69	1.81	1.95	2.10	2.27	2.44
Consumption	1.65	1.79	1.94	2.10	2.28	2.47	2.67
Surplus (-deficit)	-0.01	-0.10	-0.13	-0.15	-0.18	-0.20	-0.23
Eastern Europe							
Supply capability	7.08	7.49	8.39	8.83	9.47	10.23	10.62
Consumption	7.00	7.25	8.30	9.10	9.90	10.90	11.90
Surplus (-deficit)	0.08	0.24	0.09	-0.27	-0.43	-0.67	-1.28
Total centrally planned economies							
Supply capability	8.72	9.18	10.20	10.78	11.57	12.50	13.06
Consumption	8.65	9.04	10.24	11.20	12.18	13.37	14.57
Surplus (-deficit)	0.07	0.14	-0.04	-0.42	-0.61	-0.87	-1.51
World total							
Supply capability	27.28	32.49	34.09	35.31	37.44	39.64	40.68
Available supply[2]	26.02	31.52	33.07	34.25	36.32	38.45	39.46
Consumption	26.49	27.61	29.49	31.48	33.29	35.43	37.52
Surplus (deficit)[3]	-0.47	3.91	3.58	2.77	3.03	3.02	1.94

[1] Forecast total phosphate fertilizer 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, to avoid double counting, the phosphate rock contribution into the manufacturing of concentrated superphosphates (30%) and nitrophosphates (60-100%, depending on region). For new plants coming on stream, the escalation of capacity utilization is assumed at 40, 80 and 90% in developed countries and at 35, 70 and 80% in developing countries and Socialist Asia 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] 97% of world production in the forecasts, reflecting past experience, to account for normal stock increases, transportation and distribution losses and the time lag between production and consumption. In the past 9 years, this ratio has varied between 94% and 98%. [3] Through the adjustment in footnote 2, the world balance of "Available Supply" and "Consumption" is not equal to the sum of the regional balance of "Supply Capability" and "Consumption."

Source: Actual: FAO.
Forecasts:, FAO/UNIDO/World Bank Fertilizer Working Group, June 1978.

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

(million metric tons of nutrients)

Region	Actual	Forecast					
	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
North America							
Supply capability	8.00	9.14	9.23	9.35	9.48	9.83	10.17
Consumption	5.54	5.37	5.79	5.81	6.10	6.28	6.50
Surplus (-deficit)	2.46	3.77	3.44	3.54	3.38	3.55	3.67
Western Europe							
Supply capability	4.54	6.14	6.34	6.54	6.62	6.58	6.54
Consumption	4.91	5.22	5.48	5.78	5.98	6.17	6.32
Surplus (-deficit)	-0.37	0.92	0.85	0.76	0.64	0.40	0.22
Oceania							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.25	0.24	0.25	0.30	0.32	0.35	0.38
Surplus (-deficit)	-0.25	-0.24	-0.25	-0.30	-0.32	-0.35	-0.38
Other developed market economies							
Supply capability	0.65	0.71	0.71	0.71	0.71	0.81	0.86
Consumption	0.84	0.84	0.86	0.87	0.89	0.90	0.91
Surplus (-deficit)	-0.20	-0.13	-0.14	-0.16	-0.17	-0.09	-0.05
Total developed market economies							
Supply capability	13.19	15.99	16.28	16.60	16.81	17.22	17.56
Consumption	11.54	11.67	12.38	12.77	13.29	13.70	14.11
Surplus (-deficit)	1.65	4.32	3.90	3.84	3.53	3.51	3.45
Africa							
Supply capability	0.27	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.21	0.24	0.27	0.30	0.33	0.36	0.39
Surplus (-deficit)	0.06	-0.24	-0.27	-0.30	-0.33	-0.36	-0.39
Latin America							
Supply capability	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Consumption	1.11	1.25	1.37	1.50	1.63	1.76	1.89
Surplus (-deficit)	-1.10	-1.22	-1.35	-1.48	-1.61	-1.74	-1.87
Near East							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.14
Consumption	0.05	0.05	0.06	0.06	0.07	0.07	0.08
Surplus (-deficit)	-0.05	-0.05	-0.06	-0.06	-0.07	-0.07	-0.07
Far East							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.76	0.97	1.05	1.14	1.23	1.33	1.43
Surplus (-deficit)	-0.76	-0.97	-1.05	-1.14	-1.23	-1.33	-1.43
Total developing market economies							
Supply capability	0.28	0.02	0.02	0.02	0.02	0.02	0.17
Consumption	2.13	2.51	2.74	2.99	3.26	3.52	3.78
Surplus (-deficit)	-1.84	-2.49	-2.72	-2.97	-3.24	-3.50	-3.62
Communist Asia							
Supply capability	0.32	0.31	0.32	0.34	0.36	0.41	0.45
Consumption	0.50	0.55	0.60	0.65	0.73	0.77	0.80
Surplus (-deficit)	-0.17	-0.24	-0.28	-0.31	-0.37	-0.37	-0.35
Eastern Europe							
Supply capability	11.47	12.03	13.03	13.85	14.76	15.30	15.80
Consumption	8.91	9.25	9.70	10.24	10.72	11.29	12.05
Surplus (-deficit)	2.56	2.78	3.33	3.61	4.04	4.01	3.75
Total centrally planned economies							
Supply capability	11.79	12.34	13.35	14.19	15.12	15.70	16.25
Consumption	9.40	9.80	10.30	10.89	11.44	12.06	12.85
Surplus (- deficit)	2.39	2.54	3.05	3.30	3.67	3.64	3.40
World total							
Supply capability	25.27	28.35	29.65	30.82	31.95	32.94	33.98
Available supply	23.17	25.99	27.18	28.25	29.29	30.20	31.15
Consumption	23.07	23.98	25.42	26.65	27.99	29.28	30.75
Surplus (-deficit)	0.10	2.01	1.76	1.60	1.30	0.91	0.40

[1] "*Supply*" refers to actual production in 1976/77. In forecast years "supply" refers to supply capability should demand be there. The supply capabilities are net of losses and based on past operating experience. "*Available Supply*" refers to actual production less technical potash and transportation losses until 1976/77. In forecast years, "available supply" is the total of regional supply less 3.5% technical potash, less 5% to allow for normal stock increases transportation and distribution losses and the time lag between production and consumption. "*Consumption*" refers to actual use in 1976/77 and to forecast use in other years. "*Surplus*" (Deficit) refers to actual surpluses (deficits) in 1976/77. In forecast years, it refers to the surplus (deficit) of supply capability over forecast demand. The world total "surplus (deficit)" does not add up with the regional totals due to the adjustment described above to arrive at total "available supply" from total "supply".

Source: Actual: FAO
Forecasts: FAO/UNIDO/World Bank Fertilizer Working Group, June 1978.

Appendix table 4—Use of nitrogen as fertilizer, by States, 1973-78[1]

State and region	1973	1974	1975	1976	1977	1978
	1,000 tons of N					
Maine	16.1	16.8	14.9	14.3	14.3	13.3
New Hampshire	2.5	2.6	2.3	2.7	2.7	3.1
Vermont	7.0	7.9	7.0	7.6	7.4	6.2
Massachusetts	10.1	9.0	7.9	8.8	9.0	11.5
Rhode Island	1.8	2.7	1.6	1.9	2.3	1.5
Connecticut	9.0	8.6	7.7	8.3	8.9	7.8
New York	88.0	91.8	88.6	77.9	86.8	84.4
New Jersey	26.4	25.2	24.6	25.3	24.6	23.2
Pennsylvania	91.0	85.0	78.6	95.7	96.8	98.2
Delaware	15.1	15.5	14.7	16.9	19.9	15.6
Maryland	55.0	46.6	54.7	57.0	70.2	56.6
Dist. of Columbia	.6	.8	1.0	1.1	1.1	.9
Northeast	322.6	312.5	303.6	317.5	344.0	322.3
Michigan	143.8	155.7	136.7	184.0	217.4	216.2
Wisconsin	116.7	140.0	133.4	171.8	203.9	214.0
Minnesota	424.0	412.8	450.3	561.3	521.0	491.7
Lake States	684.5	708.5	720.4	917.1	942.3	921.9
Ohio	237.8	289.5	281.7	355.7	363.5	347.2
Indiana	327.5	361.7	326.3	417.6	495.7	504.2
Illinois	570.9	729.7	817.8	934.5	977.6	792.5
Iowa	643.7	750.6	746.9	1,042.9	852.4	921.1
Missouri	276.2	352.5	304.8	405.1	406.3	308.6
Corn Belt	2,056.1	2,484.0	2,477.6	3,155.8	3,095.5	2,873.6
North Dakota	133.5	132.7	140.7	201.2	229.1	253.1
South Dakota	98.8	104.5	82.1	112.3	95.8	104.9
Nebraska	566.9	588.9	492.0	653.0	748.9	733.8
Kansas	503.4	564.5	568.0	645.0	636.8	551.5
Northern Plains	1,302.7	1,390.5	1,282.7	1,611.5	1,710.6	1,643.1
Virginia	86.4	82.2	90.8	99.4	114.4	98.7
West Virginia	8.2	8.7	6.4	8.7	10.7	9.0
North Carolina	203.2	218.5	220.1	254.2	261.8	222.3
Kentucky	113.3	128.8	124.8	152.2	182.8	157.7
Tennessee	104.2	113.0	100.8	109.1	131.0	119.6
Appalachian	515.3	551.3	542.8	623.6	700.6	607.2
South Carolina	97.3	104.2	89.6	112.6	116.0	97.4
Georgia	285.4	284.6	265.4	322.3	349.8	286.8
Florida	210.0	212.1	187.4	220.4	248.7	231.9
Alabama	171.1	174.5	149.7	176.9	188.3	161.7
Southeast	763.8	775.3	692.1	832.2	902.7	777.8
Mississippi	205.1	228.5	187.1	202.9	190.5	168.5
Arkansas	122.7	152.1	127.7	156.1	173.0	135.0
Louisiana	118.1	151.7	110.6	125.8	124.3	116.0
Delta States	445.9	532.2	425.4	484.9	487.8	419.5
Oklahoma	202.6	211.2	190.7	229.6	256.6	243.5
Texas	711.6	802.3	624.7	747.2	748.6	685.4
Southern Plains	914.2	1,013.4	815.4	976.8	1,005.2	928.9
Montana	52.9	46.0	39.0	54.0	64.0	54.0
Idaho	124.9	125.2	127.5	156.2	139.0	161.0
Wyoming	22.6	20.8	23.1	21.0	23.3	22.0
Colorado	97.2	118.0	110.6	128.8	118.1	136.8
New Mexico	30.9	34.6	29.9	36.6	32.3	32.3
Arizona	102.5	114.3	109.3	104.6	110.0	93.8
Utah	22.3	25.7	22.7	33.1	23.4	22.4
Nevada	4.2	4.2	3.7	5.0	4.8	5.4
Mountain	457.5	488.8	465.7	539.3	514.9	527.6
Washington	190.4	204.9	181.2	196.1	175.1	211.0
Oregon	113.9	98.2	98.9	127.8	127.2	122.7
California	479.6	545.7	556.3	587.1	596.1	572.7
Pacific	784.0	848.8	836.4	911.0	898.4	906.1
48 States + D.C.	8,246.6	9,105.5	8,562.1	10,369.6	10,602.1	9,928.1
Alaska	1.2	.9	.6	1.0	1.8	1.0
Hawaii	28.0	26.3	25.9	25.2	25.7	28.8
United States	8,275.8	9,132.7	8,588.6	10,395.5	10,629.6	9,957.9

[1] Totals may not add due to rounding.

Source: "Consumption of Commercial Fertilizers in the United States," SPCR 7 (11-78) and earlier issues, Crop Reporting Board, ESCS, USDA, November, 1978.

Appendix table 5–Use of phosphorous as fertilizer, by States, 1973-778[1]

State and region	1973	1974	1975	1976	1977	1978
	1,000 tons available P^2O^5					
Maine	18.7	18.8	16.3	17.3	17.0	15.0
New Hampshire	1.9	2.1	2.3	3.3	2.2	2.6
Vermont	6.8	7.7	5.9	6.5	8.6	5.5
Massachusetts	7.7	7.0	5.6	6.0	5.9	7.6
Rhode Island	1.6	2.6	1.4	1.2	1.6	1.3
Connecticut	6.7	5.5	5.2	6.6	5.8	5.3
New York	83.7	78.2	69.8	73.2	78.5	76.8
New Jersey	22.4	20.7	20.0	19.6	21.5	17.5
Pennsylvania	96.4	96.3	77.2	92.7	94.7	91.7
Delaware	15.9	13.7	12.2	12.0	14.3	11.5
Maryland	55.6	43.9	46.0	44.0	.5	.5
Dist. of Columbia	.6	.5	.6	.4	59.7	49.9
Northeast	318.0	297.0	262.4	284.0	310.2	285.3
Michigan	139.7	148.4	114.5	144.7	161.7	168.5
Wisconsin	132.2	139.7	130.8	144.8	165.9	170.3
Minnesota	280.3	167.9	290.0	321.9	295.6	274.7
Lake States	552.2	556.0	535.3	610.9	623.2	613.4
Ohio	244.6	271.0	246.9	275.4	287.6	268.7
Indiana	264.0	292.4	218.7	282.6	339.8	324.0
Illinois	479.1	477.1	422.7	509.0	587.1	460.5
Iowa	380.3	396.6	424.5	463.9	417.8	423.9
Missouri	177.2	189.9	152.8	203.9	211.4	167.8
Corn Belt	1,545.2	1,627.0	1,465.6	1,734.8	1,843.7	1,644.9
North Dakota	108.0	110.2	105.6	130.9	140.7	120.3
South Dakota	62.2	61.9	55.3	66.1	55.9	60.8
Nebraska	157.6	146.6	110.9	148.8	186.0	160.4
Kansas	199.5	178.8	173.8	198.9	198.8	158.4
Northern Plains	527.3	497.4	445.6	544.7	581.3	500.0
Virginia	76.8	70.4	68.9	71.7	78.5	72.5
West Virginia	10.9	9.5	7.4	8.9	10.8	7.9
North Carolina	144.7	156.9	143.6	161.5	163.9	150.0
Kentucky	112.2	112.4	104.5	130.8	150.5	133.0
Tennessee	99.6	95.9	79.6	95.5	122.4	111.7
Appalachian	444.2	445.2	4403.9	467.8	526.1	475.1
South Carolina	74.9	75.7	60.1	69.7	77.8	66.8
Georgia	161.3	153.9	131.7	157.5	180.3	153.3
Florida	111.0	104.9	87.5	102.6	112.8	111.0
Alabama	116.3	115.0	92.2	99.5	114.5	109.0
Southeast	463.5	449.6	371.5	429.3	485.4	440.0
Mississippi	87.8	87.4	68.2	72.1	90.2	77.6
Arkansas	77.3	80.9	56.6	71.8	78.4	66.1
Louisiana	61.7	71.5	58.6	60.8	68.4	71.3
Delta States	226.8	239.8	183.4	204.7	237.1	215.0
Oklahoma	109.1	105.4	88.8	103.3	113.2	85.8
Texas	288.9	297.4	224.0	263.9	277.7	250.8
Southern Plains	398.0	402.7	312.8	367.2	390.9	336.7
Montana	62.4	60.8	44.0	63.0	74.3	59.8
Idaho	74.8	68.9	70.1	68.4	61.1	64.7
Wyoming	14.5	10.8	11.2	8.3	10.4	6.6
Colorado	48.0	44.6	46.1	53.8	43.8	46.8
New Mexico	21.8	15.7	11.2	16.9	17.6	16.8
Arizona	39.0	36.0	29.8	37.6	41.5	29.6
Utah	27.6	24.8	20.5	16.6	21.0	14.7
Nevada	3.1	2.7	2.4	3.0	2.1	1.8
Mountain	291.2	264.4	235.4	267.6	271.7	240.9
Washington	63.2	71.1	64.1	69.9	65.3	60.7
Oregon	49.1	40.6	37.9	40.8	50.3	42.1
California	178.8	178.3	165.0	181.6	213.2	208.0
Pacific	291.1	290.0	266.9	292.3	328.8	310.8
48 States + D.C.	5,057.5	5,069.1	4,482.8	5,202.2	5,598.5	5,062.0
Alaska	.7	.5	.5	.7	1.3	.9
Hawaii	19.4	19.9	20.1	18.1	23.3	30.0
United States	5,077.6	5,089.5	4,503.4	5,221.0	5,623.1	5,092.9

[1] Totals may not add due to rounding.

Source: "Consumption of Commercial Fertilizers in the United States," SPCR 7 (11-78) and earlier issues, Crop Reporting Board, ESCS, USDA, November, 1978.

Appendix table 6—Use of potash as fertilizer, by States, 1973-78[1]

State and region	1973	1974	1975	1976	1977	1978
	1,000 tons of K^2O					
Maine	18.4	19.3	17.0	17.3	16.9	15.7
New Hampshire	2.3	2.7	2.4	3.2	2.9	3.3
Vermont	7..7	9.1	6.7	7.9	7.3	6.5
Massachusetts	6.9	7.3	6.0	6.8	6.6	8.6
Rhode Island	1.5	2.5	1.4	1.3	1.6	1.1
Connecticut	6.8	7.3	5.4	6.3	4.8	5.1
New York	78.7	79.0	70.9	74.8	81.4	83.9
New Jersey	21.1	21.9	19.8	21.3	23.2	21.0
Pennsylvania	77.1	83.5	72.2	89.1	88.6	90.6
Delaware	20.4	19.4	18.9	19.4	23.1	17.9
Maryland	61.4	56.5	57.3	57.9	.4	.4
Dist. of Columbia	.4	.4	.5	.4	73.5	59.8
Northeast	302.9	308.7	278.6	305.7	330.3	313.8
Michigan	164.9	179.8	146.3	187.3	219.2	233.9
Wisconsin	228.5	271.3	237.0	290.3	351.9	381.0
Minnesota	288.7	323.1	329.1	350.6	360.8	358.0
Lake States	682.1	774.2	712.4	828.2	931.9	972.9
Ohio	271.6	309.8	281.5	329.8	351.3	350.9
Indiana	338.2	403.7	318.2	397.5	522.0	468.4
Illinois	533.5	605.8	531.5	658.3	764.3	665.5
Iowa	391.0	460.4	442.8	496.4	478.1	458.8
Missouri	200.5	216.8	185.2	254.5	268.3	218.6
Corn Belt	1,734.8	1,996.6	1,759.3	2,136.5	2,384.1	2,162.3
North Dakota	13.5	17.6	16.5	18.0	18.7	19.3
South Dakota	13.8	16.1	13.3	14.5	15.0	15.4
Nebraska	53.2	57.4	44.2	55.1	69.7	63.8
Kansas	90.9	62.0	45.7	48.4	54.7	43.4
Northern Plains	171.4	153.1	119.7	136.0	158.2	141.9
Virginia	89.0	80.8	83.7	89.4	97.5	90.1
West Virginia	6.5	8.7	5.0	7.5	8.8	8.7
North Carolina	187.8	203.7	189.7	224.2	233.1	216.5
Kentucky	122.8	134.4	117.0	148.3	169.7	158.0
Tennessee	107.1	108.0	88.3	109.2	130.3	134.2
Appalachian	513.3	535.7	483.7	578.6	639.4	607.6
South Carolina	103.9	113.6	92.2	112.9	133.0	116.0
Georgia	238.6	242.2	209.9	246.7	273.9	235.9
Florida	231.8	232.1	210.7	242.1	249.7	256.4
Alabama	121.4	124.1	99.7	112.2	132.3	127.5
Southeast	695.8	712.0	612.4	713.9	788.8	735.8
Mississippi	83.5	81.4	62.3	72.7	95.9	92.0
Arkansas	82.3	95.0	66.0	84.6	96.2	86.1
Louisiana	61.2	67.7	60.5	64.5	75.4	79.4
Delta States	227.0	244.1	188.8	221.8	267.4	257.6
Oklahoma	39.0	41.3	28.0	29.3	34.3	32.1
Texas	115.5	133.3	92.0	80.6	98.7	95.2
Southern Plains	154.5	174.7	120.0	109.9	132.9	127.4
Montana	3.0	4.2	3.2	5.7	8.6	5.3
Idaho	5.3	7.1	11.6	14.5	12.8	15.1
Wyoming	1.9	.9	1.3	1.0	1.7	.8
Colorado	7.8	10.1	9.2	9.9	11.0	9.4
New Mexico	1.8	2.8	1.3	1.7	1.6	2.4
Arizona	1.5	1.5	1.4	.6	1.2	1.8
Utah	.8	.9	.7	1.3	.8	2.4
Nevada	.2	.2	.2	.2	.2	.2
Mountain	22.3	27.7	28.8	34.9	37.9	37.3
Washington	23.9	26.8	23.2	27.5	30.2	32.9
Oregon	20.1	17.7	14.2	18.5	25.6	26.8
California	61.5	71.2	73.6	61.2	69.1	74.4
Pacific	105.5	115.8	111.0	107.2	124.9	134.1
48 States + D.C.	4,609.6	5,042.7	4,414.8	5,172.7	5,795.7	5,490.7
Alaska	.5	.3	.4	.5	1.2	.6
Hawaii	24.0	22.8	23.3	25.0	24.0	23.3
United States	4,634.1	5,065.8	4,439.5	5,198.2	5,820.9	5,514.6

[1] Totals may not add due to rounding.

Source: "Consumption of Commercial Fertilizers in the United States," SPCR 7 (11-78) and earlier issues, Crop Reporting Board, ESCS, USDA, November 1978.

*U.S. GOVERNMENT PRINTING OFFICE: 1978 0-280-934/ESCS-61

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

To stop mailing ☐ or to change your address ☐ send this sheet with label intact, showing new address, to Information, Staff, ESCS, U.S. Dept. of Agriculture, Rm. 0054 South Building, 14th & Independence Ave. S.W., Wash., D.C. 20250.

FS-9 DECEMBER 1978

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF
AGRICULTURE
AGR 101
FIRST CLASS