

United States  
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Economic  
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December 1982

# Fertilizer

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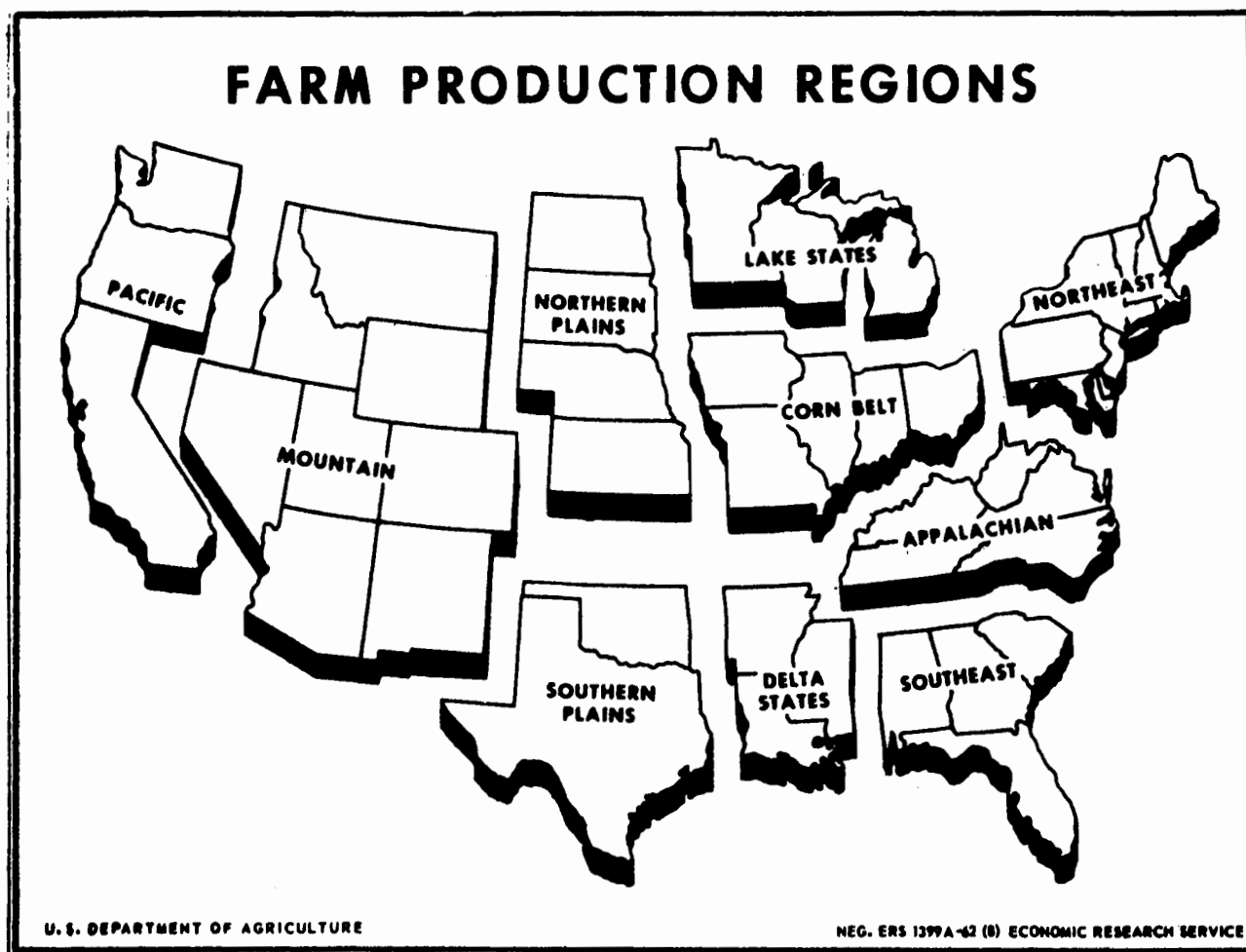
# OUTLOOK & SITUATION

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See back cover for details on  
ordering the next FERTILIZER report.

10  
 2483  
 2412  
 1732

Conversion Factors		
To convert	To	Multiply by
P <sub>2</sub> O <sub>5</sub> .....	P	0.43642
P .....	P <sub>2</sub> O <sub>5</sub>	2.29137
K <sub>2</sub> O .....	K	.83016
K .....	K <sub>2</sub> O	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 <sub>2</sub> O <sub>5</sub> .....	P	.08728
46 percent P <sub>2</sub> O <sub>5</sub> .....	P	.20075
Potash:		
60 percent K <sub>2</sub> O .....	K	.49810
62 percent K <sub>2</sub> O .....	K	.51470
Potassium chloride .....	K <sub>2</sub> O	.63177
Metric tons		
(tonnes, 2204.6 av. lbs.)	Short tons	1.10231
Long tons		
(2240 av. lbs.) .....	Short tons	1.12



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The World Agricultural  
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Principal Contributor:  
Paul Andrienas  
(202) 447-7340

National Economics Division  
Economic Research Service  
U.S. Department of Agriculture  
Washington, D.C. 20250

## Summary

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Record crop production and weakened demand for farm products suggest a level of commodity prices that will dampen the expansion in fertilizer application rates in 1982/83 (July-June). In addition, acreage reduction programs will likely decrease crop area, particularly for the major fertilizer users, corn and wheat.

Plant-nutrient consumption could be down at least 3 to 5 percent from 1981/82's depressed 21.5 million short tons. Fall 1982 movement of fertilizer was below a year earlier, and if the spring season lags behind last year, consumption could be down even more. Nitrogen consumption is forecast at 10.6 to 10.8 million tons; phosphate, 4.5 to 4.6 million; and potash, 5.3 to 5.4 million.

The overall fertilizer prices farmers will pay this spring could average 1 to 2 percent lower than a year earlier. Stable or reduced demand, continued imports of nitrogen fertilizer, and above-normal producer inventories of potash will dampen price increases. However, any upsurge in spring demand could cause short periods of tight supplies and stronger prices, especially for nitrogen, since idle production capacity cannot be quickly reactivated.

Although supplies in the pipeline are low, substantial manufacturer inventories of nitrogen and potash and the reactivation of idle production capacity would keep fertilizer supplies adequate. Domestic fertilizer production capacity is currently underutilized. About three-fourths of the available production capacity for anhydrous ammonia is being used. The capacity to produce wet-process phosphoric acid is being used at 70 to 75 percent, while U.S. and Canadian production capacities for potash are being used at about 75 and 60 percent, respectively.

Last year, primary-nutrient consumption in the United States was down 9 percent, mainly because of fewer corn, cotton, and wheat acres and decreases in fertilizer application rates, especially for phosphate and potash. Nitrogen use decreased 7 percent to 11.1 million tons, while phosphate and potash were down 11 percent to 4.8 and 5.6 million, respectively. Fertilizer use was down in all parts of the country except the Mountain region. Use fell the most in the Southeast and Southern Plains.

Last year's application rates of the three primary nutrients were generally down for corn, soybeans, and wheat, but nitrogen and potash rates were up for cotton. The amount of nitrogen applied per acre of corn declined more than 4 percent to 131 pounds, and phosphate and potash rates were off 10 and 8 percent, respectively. The amounts of phosphate and potash applied per acre were down for soybeans and wheat, with the potash rate for wheat down the most—21 percent. The nitrogen application rate for soybeans declined 6 percent, while the rate for wheat remained unchanged. Nitrogen and potash application rates for cotton were up 14 and 20 percent, respectively, while the phosphate rate equaled a year earlier. Cotton rates increased as reduced plantings shifted a larger proportion of cotton production from Texas, an area with lower application rates, to the higher use areas of the Southeast and Delta.

The U.S. fertilizer trade balance declined in 1981/82. While the volume of fertilizer imports decreased, the value increased slightly, and the export value declined for the second year. The United States imported 11.7 million metric tons of fertilizer worth about \$1.4 billion, a 10-percent decline in volume and a 2-percent increase

in value. Export volume fell to 21.5 million metric tons, a 20-percent drop. The value slid to about \$2.5 billion, also down 20 percent. The United States was again a large exporter of phosphate and a big importer of potassium. Nitrogen imports equaled exports.

For 1982/83, moderately increasing nitrogen imports and exports could balance at year's end. U.S. imports and exports are expected to be about 2.5 to 2.7 million short tons (2.3 to 2.5 million metric tons). Phosphate exports, at 3.6 to 3.8 million tons (3.3 to 3.5 million metric tons), could be even with or up from last year. Potash imports, at 4.6 to 4.8 million tons (4.2 to 4.4 mil-

lion metric tons), could be even with or below a year earlier. Potash exports could change little from last year's 0.6 million tons (.54 million metric tons).

World fertilizer consumption in 1982/83 could increase slightly from last year's 117 million metric tons. Existing world production facilities will be ample for satisfying anticipated use. World supplies of nitrogen, phosphate, and potash fertilizers should be sufficient to meet expected demand through 1986/87. Furthermore, the currently depressed world market for fertilizer and the expected slow recovery in consumption suggest that production capacity will be adequate through 1986/87.

## Fertilizer Situation

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### OUTLOOK FOR 1982/83

Record crop production and weakened demand for farm products suggest a level of commodity prices that will dampen the expansion in fertilizer application rates in 1982/83. In addition, acreage reduction programs will likely decrease crop area, particularly for the major fertilizer users, corn and wheat.

Total plant nutrient consumption could be down 3 to 5 percent from 1981/82's depressed 21.5 million short tons. Fall 1982 movement of fertilizer has been below a year earlier, and if the spring season lags behind last year, consumption could be down even more. An unusually strong spring recovery would be necessary for nutrient consumption to return to the 1981/82 level.

Farm prices of most fertilizers have weakened from spring and summer 1982, and a strong 1983 spring season is also necessary to strengthen prices. Overall average fertilizer prices paid by farmers in spring 1983 are expected to be down moderately, 1 to 2 percent, as stable or reduced demand, continued imports of nitrogen fertilizer, and above-normal producer inventories of potash dampen price increases. If retailers rebuild their currently low inventories of phosphate fertilizers, movement and prices could strengthen. However, any upsurge in spring demand could cause short periods of tight supplies and stronger prices, especially for nitrogen, as producers scramble to increase output by reactivating idle production capacity.

Supplies of fertilizer materials will be adequate. Although supplies in the pipeline are low, substantial manufacturer inventories of nitrogen and potash and the

reactivation of idle phosphate and potash production capacity is expected to keep fertilizer supplies adequate.

Domestic fertilizer production capacity is currently being underutilized. About three-fourths of anhydrous ammonia capacity, estimated at over 18 million tons in operating and idle plants, is currently being used. Capacity to produce wet-process phosphoric acid, at 11 million tons, is being used at a 70- to 75 percent rate. U.S. potash capacity, at 2.4 million tons, and Canadian capacity, at about 9 million, are being used at about 75 and 60 percent, respectively.

World consumption of fertilizer nutrients during 1982/83 is estimated to increase slightly from 117.4 million metric tons, following a 1-percent increase in 1981/82. Existing production facilities are ample for satisfying anticipated use, because recent depressed conditions in world agriculture have lowered expectations of fertilizer use in the next several years.

### Nitrogen Use Depends on Agriculture's Economic Well-Being

Nitrogen and phosphate fertilizer prices are expected to rise more from fall 1982 to spring 1983 than potash prices. With nitrogen fertilizer use down moderately from 1981/82, spring 1983 prices may not move up the 3 to 4 percent needed to equal May 1982 prices. A slightly declining or stable domestic market, along with depressed agricultural conditions, will not support substantial price increases. In addition, the prices received

**Table 1—Supply-utilization balance by fertilizer year, 1980/81 to 1982/83**

Item	Nitrogen			Phosphate <sup>2</sup>			Potash		
	1980/81	1981/82	1982/83 <sup>1</sup>	1980/81	1981/82	1982/83 <sup>1</sup>	1980/81	1981/82	1982/83 <sup>1</sup>
<i>Million nutrient tons</i>									
Producers' beginning inventory	1.86	1.85	2.07	.80	.91	.68	.30	.35	.57
Production	15.87	14.53	13.50-13.80	11.48	8.77	8.90-9.40	2.39	2.16	1.90-2.10
Imports	2.45	2.52	2.50-2.70	.25	.20	.20	5.49	4.78	4.60-4.78
Total available supply	20.18	18.90	18.07-18.57	12.53	9.88	9.78-10.28	8.18	7.29	7.07-7.45
Agricultural consumption	11.78	11.10	10.60-10.80	5.43	4.82	4.50-4.60	6.24	5.61	5.30-5.40
Exports	3.09	2.50	2.50-2.70	4.41	3.66	3.60-3.80	.88	.64	.60-.70
Total agricultural and export demand	14.87	13.60	13.10-13.50	9.84	8.48	8.10-8.40	7.12	6.25	5.90-6.10
Producers' ending inventory	1.85	2.07	1.80	.91	.68	.70	.35	.57	.45-.55
Available for nonagricultural use	3.46	3.23	3.27-3.17	1.78	.72	.98-1.18	.71	1.04	.68-.80

<sup>1</sup>Estimated. <sup>2</sup>Does not include phosphate rock.

by domestic producers of anhydrous ammonia will be under pressure from imports. However, prices could rise rapidly with improved demand or import interruption.

Although producer prices are down, these lower prices will not be fully reflected in lower farm prices. Retailers and distributors will attempt to use lower producer prices to maintain or increase profit margins, as they did in 1981/82.

Domestic consumption of nitrogen, as well as phosphate and potash, will depend on the economic health of agriculture. Any improvement in farm income prospects will probably contribute to increased nitrogen use. Projected consumption for 1982/83, at 10.6 to 10.8 million tons, will be below the 11.1 million used in 1981/82 (table 1). An anticipated increase in application rates is not likely to offset the expected cut in planted acres.

A small recovery in nitrogen exports is expected in 1982/83 because of an increase in diammonium phosphate exports and in early-season exports of nitrogen solutions and anhydrous ammonia. Compared with 2.5 million tons in 1981/82, exports in 1982/83 are expected to range between 2.5 to 2.7 million. Because of low-cost gas, some countries can produce ammonia cheaper than the United States does. As a result, imports will gain a bigger share of the domestic market.

Many of the factors that reduced fertilizer trade in 1981/82—the relatively strong U.S. dollar, high interest rates, and weakened economic activity—will continue to depress exports in 1982/83. On the other hand, the relatively strong dollar will encourage imports. The price competitiveness of anhydrous ammonia imports will be the main strength of U.S. nitrogen purchases.

Supplies of nitrogen fertilizer are expected to be adequate. However, to meet expected demand, some idle production capacity will need to be reactivated, even though producer inventories are above normal. In

1981/82, over 4 million tons of the 19.8 million of available anhydrous ammonia production capacity were permanently or temporarily closed. As much as 1 million tons could be reactivated to meet needs for nitrogen fertilizer in 1982/83. Given the possibility of periods of tight nitrogen supplies, producers' 1982/83 ending stocks will probably be down from a year earlier.

### Slow Season Pushes Down Phosphate Prices

A very slow 1982 fall season caused farm prices for phosphate fertilizers to decline about 5 percent from May 1982. With producer inventories down to more normal levels and pipeline stocks almost depleted at the end of 1981/82, prices of phosphate fertilizer could rise to last spring's level. However, for prices to rise above last spring's level, recovery in the pace of export trade and domestic use will need to be greater than currently anticipated. A sudden surge of exports during the domestic spring season could cause prices to climb, however.

The reactivation of idle production capacity is expected to keep phosphate fertilizer supplies adequate for normal fertilizer demand next spring. Spot shortages are possible, but ample production capacity and farmers' resistance to high prices because of low cash flows will prevent a runup in phosphate prices.

Compared with last year, domestic consumption of phosphate fertilizer in 1982/83 is expected to be down 3 to 5 percent to 4.5 to 4.6 million tons. The expected drop is attributed to fewer crop acres and low crop prices.

U.S. exports of phosphate fertilizers in 1982/83 could be up sparingly to about 3.7 million nutrient tons. Although some improvement in general worldwide economic conditions would indicate an increase in

exports, buyers of phosphate fertilizer may be slow to respond. During July-October 1982, phosphate shipments dropped about 12 percent from the year-earlier level, which was off from the previous year.

Production facilities are adequate to meet phosphate fertilizer needs for both domestic users and exporters at expected levels of disappearance. Phosphate producers responded to falling domestic sales, declining exports, lower prices, and burdensome inventories by cutting production. With producer inventories down to about normal and retailers' and distributors' stocks at minimum working levels, idled production capacity will be reactivated with any additional recovery in domestic and export demand.

## Potash Use and Prices Likely To Fall

Compared with a year earlier, spring 1983 prices are likely to be down moderately. High producer inventories, reduced domestic consumption, a depressed export market, attempts to save transportation costs, and ample production capacity will all dampen prospects for any price increase.

U.S. potash use in 1982/83 is expected to total about 5.3 to 5.4 million tons, compared with 5.6 million in 1981/82. Potash consumption, like phosphate and nitrogen use, will be affected by fewer crop acres and depressed agricultural conditions.

Potash supplies should be adequate in 1982/83. Excess producer stocks have caused some manufacturers to idle capacity or maintain production capacity on a reduced schedule. Nevertheless, if demand should increase, production capacity will be reactivated. Producers have moved potash fertilizer materials to regional warehouses, thus better assuring prompt delivery if there's a surge in dealer ordering.

Potash imports will likely fall as domestic consumption declines. However, a decline in domestic production could boost imports to the year-earlier level.

## REVIEW OF 1981/82 TRADE, PRICES, AND USE

### Manufacturer Inventories Unusually High

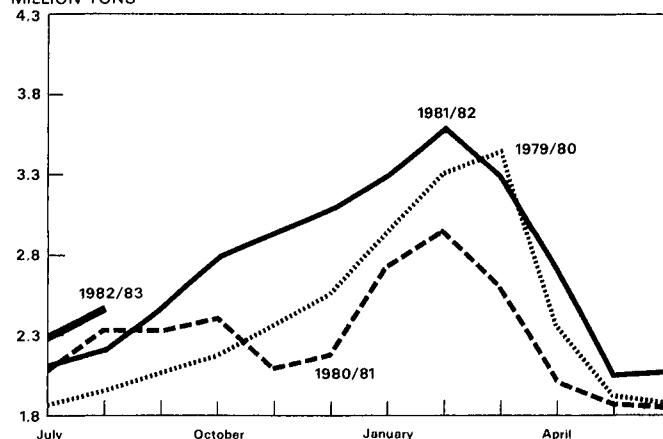
Decreased domestic and export demand, coupled with excessive production, caused producer stocks of the three plant nutrients to reach unusually high levels early in 1981/82. However, reduced production in the last half of the year brought stocks of nitrogen and phosphate fertilizer down to more desirable levels. Producers also started to reduce potash stocks.

In December 1981, producer inventories of nitrogen fertilizer were above a year earlier, but lower-than-expected demand without appropriate adjustments in production pushed spring 1982 stocks to a 3-year high (fig. 1 and table 2). Declining anhydrous ammonia prices caused many high-cost plants to close. With reduced ammonia production, 1981/82 yearend inventories dropped to about the same as a year earlier.

Producer inventories of phosphate were unusually high at the beginning of 1981/82 (fig. 2). Therefore, producers reduced 1982 output by even more than the drop in domestic and export sales. Consequently, producer stocks declined to normal levels by the fall of 1982/83 (table 3).

### Nitrogen Fertilizer Manufacturer Inventories\*

MILLION TONS



\*Includes Urea

**Table 2—Manufacturer inventories of nitrogenous and phosphatic fertilizer materials and phosphoric acid (United States) and muriate of potash (United States and Canada), March 1, 1981 and 1982<sup>1</sup>**

Material	March 1,		Change
	1981	1982	
	1,000 tons	Percent	
<b>Nitrogenous fertilizer inventories<sup>2</sup></b>			
Anhydrous ammonia <sup>3</sup>	2,361	2,886	+22
Ammonium nitrate, solid	238	480	+93
Nitrogen solutions	696	739	+6
Urea <sup>3</sup>	380	686	+80
<b>Phosphatic fertilizer inventories<sup>4</sup></b>			
Normal and enriched superphosphate	29	29	0
Concentrated superphosphate	102	146	+43
Diammonium phosphates	306	255	-17
Other ammonium phosphates	82	75	-9
Other phosphatic fertilizer materials	14	15	+7
Total phosphatic fertilizers	533	520	-2
<b>Wet-process phosphoric acid inventories<sup>4</sup></b>			
	276	273	-1
<b>Muriate of potash inventories<sup>5</sup></b>			
United States	376	667	+77
Canada	950	1,824	+92

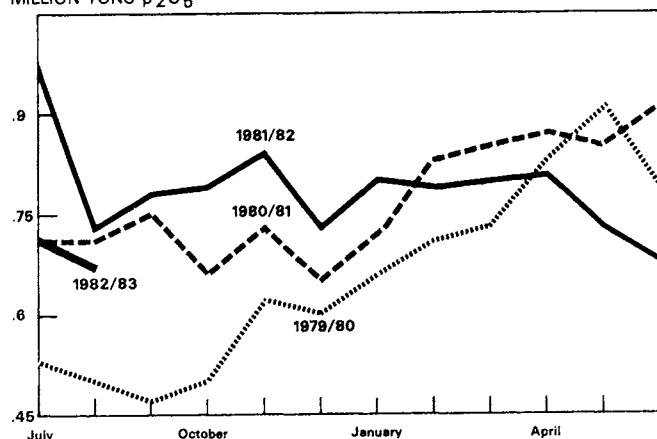
<sup>1</sup>All figures subject to revision. <sup>2</sup>Nitrogen solutions reported in 1,000 tons of N. Others reported in 1,000 tons of material. <sup>3</sup>Includes material for nonfertilizer use. <sup>4</sup>Reported in 1,000 tons of P<sub>2</sub>O<sub>5</sub>. <sup>5</sup>Reported in 1,000 tons of K<sub>2</sub>O.

Source: Nitrogenous and phosphatic materials: *Current Industrial Reports, M28B, Inorganic Fertilizer Materials and Related Products*, February and March 1982, U.S. Dept. of Commerce, Bureau of the Census. Muriate of potash: Potash/Phosphate Institute.

The combined inventories of U.S. and Canadian potash producers increased from October 1981 to March 1982 (fig. 3). Most of the gain was held by Canadian producers, as they did not reduce output sufficiently to reflect the drop in use. Beginning in April 1982, some potash production facilities were temporarily closed, and stocks began to decline. However, reopening these facilities in fall 1982 caused stocks to again climb.

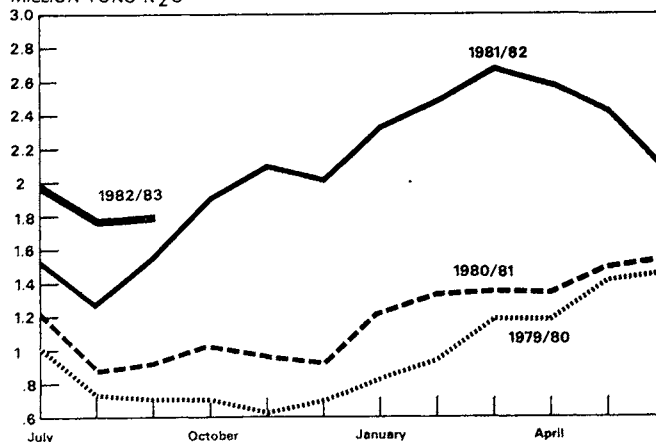
### Phosphate Fertilizer Manufacturer Inventories

MILLION TONS  $P_2O_5$



### Potash Fertilizer Manufacturer Inventories\*

MILLION TONS  $K_2O$



\*U.S. and Canadian

**Table 3—Manufacturer Inventories of nitrogenous and phosphatic fertilizer materials and phosphoric acid (United States) and muriate of potash (United States and Canada), October 1, 1981 and 1982<sup>1</sup>**

Material	October 1, October 1,		Change
	1981	1982	
	1,000 tons		Percent
Nitrogenous fertilizer inventories <sup>2</sup>			
Anhydrous ammonia <sup>3</sup>	1,818	1,965	+8
Ammonium nitrate, solid	251	180	-28
Nitrogen solutions	525	662	+26
Urea <sup>3</sup>	748	425	-43
Phosphatic fertilizer inventories <sup>4</sup>			
Normal and enriched superphosphate	24	15	-38
Concentrated superphosphate	145	98	-32
Diammonium phosphates	233	200	-14
All other phosphatic fertilizer materials	108	101	-7
Total phosphatic fertilizers	510	414	-19
Wet process phosphoric acid inventories <sup>4</sup>	294	253	-14
Muriate of potash inventories <sup>5</sup>			
United States	448	560	+25
Canada	1,099	1,235	+12

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

Source: Nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, Inorganic Fertilizer Materials and Related Products, September 1982, U.S. Dept. of Commerce, Bureau of the Census. Muriate of potash: Potash/Phosphate Institute.

### Fertilizer Production Drops Sharply

Fertilizer production dropped sharply in 1981/82 in response to reduced domestic and export demand. Demand prospects early in the year indicated fertilizer consumption would, at best, equal a year earlier. The fertilizer market, however, continued to deteriorate, and production was lowered to match depressed demand.

Anhydrous ammonia production decreased about 10 percent to 17.7 million tons in 1981/82 (table 4). Urea and solid ammonium nitrate were also down, with urea falling the most—13 percent. Nitrogen solutions were up 1 percent. Overall nitrogen fertilizer production failed to recover during July-September 1982 (first-quarter 1982/83), with output generally down about one-fourth from a year earlier. First-quarter production of urea and solid ammonium nitrate dropped the most from a year earlier.

The total output of processed phosphate fertilizer decreased by 31 percent to 5.6 million tons in 1981/82. The output of diammonium phosphate and other ammonium phosphate fertilizers declined 28 and 34 percent, respectively. Wet-process phosphoric acid production, at 7.8 million nutrient tons, declined 24 percent after several consecutive years of record production. The production of most phosphate fertilizers in the first quarter of 1982/83 dropped 10 to 40 percent from year-earlier levels. However, the output of diammonium phosphate increased in order to replenish low inventories and to meet domestic and export needs.

U.S. production of potash declined about 10 percent in 1981/82, to 2.2 million nutrient tons, while Canadian production was down about 18 percent to 6.7 million tons. Early in the year, potash production continued at the high 1980/81 pace, but reduced demand pushed inven-

**Table 4—Production of nitrogenous and phosphatic fertilizer materials and phosphoric acid (United States) and muriate of potash (United States and Canada), years ending June 30, 1981 and 1982<sup>1</sup>**

Material	1981	1982	Change
	1,000 tons		Percent
Nitrogenous fertilizers <sup>2</sup>			
Anhydrous ammonia <sup>3</sup>	19,542	17,667	-10
Ammonium nitrate, solid	3,465	3,185	-8
Urea <sup>3</sup>	7,944	6,885	-13
Nitrogen solutions	2,904	2,927	+1
Phosphatic fertilizers <sup>4</sup>			
Normal and enriched superphosphate	314	161	-49
Concentrated superphosphate	1,709	1,120	-34
Diammonium phosphates	5,000	3,495	-30
Other ammonium phosphates	1,136	744	-35
Other phosphatic fertilizer materials	55	41	-30
Total phosphatic fertilizers	8,131	5,603	-31
Wet process phosphoric acid <sup>4, 5</sup>	10,311	7,834	-24
Muriate of potash <sup>6</sup>			
United States	2,391	2,164	-10
Canada	8,088	6,661	-18

<sup>1</sup>All figures subject to revision. <sup>2</sup>Nitrogen solutions reported in 1,000 tons of N. Others reports in 1,000 tons of material. <sup>3</sup>Includes material for nonfertilizer use. <sup>4</sup>Reported in 1,000 tons of P<sub>2</sub>O<sub>5</sub>. <sup>5</sup>Includes merchant acid. <sup>6</sup>Reported in 1,000 tons of K<sub>2</sub>O.

Sources: Nitrogenous and phosphatic materials: *Current Industrial Reports*, M28B, Inorganic Fertilizer Materials and Related Products, July 1982 and earlier issues, U.S. Dept. of Commerce, Bureau of the Census. Muriate of potash: Potash/Phosphate Institute.

ties to a record level, and production was curtailed to bring supplies in line. During July-October 1982, combined U.S. and Canadian production continued below a year earlier in the face of large producer stocks.

## Fertilizer Trade

For 1981/82, the volume of imports and exports declined from a year earlier, while the value of imports remained about equal to 1980/81 (tables 5, 6, 7, and 8). In addition, the value of fertilizer exports declined. About 11.7 million metric tons of fertilizer valued at \$1.4 billion were imported by the United States, a 10-percent decline in volume. The export volume fell 20 percent to 21.5 million tons in 1981/82. The export value also dropped 20 percent to \$2.5 billion.

On a nutrient basis, the United States continued to import large amounts of potassium fertilizer and export large quantities of phosphates. In 1981/82 nitrogen imports and exports were about equal. Preliminary estimates indicate that exports of phosphate fertilizer (excluding phosphate rock), while down, still exceeded imports by nearly 3.2 million tons. Potash imports declined, but they exceeded exports by about 3.8 million tons.

## Nitrogen Imports Rise

Overall, imports of nitrogen increased about 3 percent in 1981/82, primarily because of a modest rise in shipments of anhydrous ammonia and urea. Taken together,

**Table 5—U.S. imports of selected fertilizer materials, years ending June 30, 1979-82**

Material	1979	1980	1981	1982 <sup>1</sup>
	1,000 metric tons			
Anhydrous ammonia	1,581	2,013	1,960	2,035
Urea	989	1,031	845	864
Ammonium nitrate	249	240	224	258
Ammonium sulfate	233	251	257	294
Sodium nitrate	118	145	129	128
Calcium nitrate	95	122	113	126
Nitrogen solutions	170	125	127	143
Other nitrogen fertilizer	76	66	113	78
Ammonium phosphates	272	288	337	261
Crude phosphates	781	785	247	17
Phosphoric acid	82	41	38	36
Normal & concentrated superphosphate	25	53	47	24
Other phosphatic fertilizer	11	29	28	10
Potassium chloride	7,658	8,137	8,285	7,240
Potassium sulfate	36	55	31	28
Potassium nitrate <sup>2</sup>	78	63	66	48
Other potassic fertilizer	1	3	0	0
Mixed and nonspecific fertilizer	158	150	136	132
Total	12,613	13,597	12,983	11,720

<sup>1</sup>Preliminary. <sup>2</sup>Includes potassium sodium nitrate.

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

**Table 6—U.S. fertilizer imports: Declared value of selected materials, years ending June 30, 1979-82**

Material	1979	1980	1981	1982 <sup>1</sup>
	Million dollars			
Anhydrous ammonia	149.8	203.3	225.5	295.5
Urea	129.2	151.6	127.8	155.8
Ammonium nitrate	22.9	25.6	26.7	35.4
Ammonium sulfate	17.5	20.1	23.9	29.4
Sodium nitrate	10.9	14.8	14.7	16.2
Calcium nitrate	6.1	7.3	7.9	10.0
Nitrogen solutions	18.3	16.9	18.2	19.2
Other nitrogen fertilizer	10.4	10.0	18.8	14.8
Ammonium phosphates	35.1	43.0	66.3	53.7
Crude phosphates	21.1	19.3	6.3	0.7
Phosphoric acid	10.2	2.6	8.5	3.3
Normal & concentrated superphosphate	2.8	9.0	8.3	4.1
Other phosphatic fertilizer	1.6	4.5	5.3	2.1
Potassium chloride	419.5	538.1	735.5	687.3
Potassium sulfate	3.5	7.1	5.7	5.3
Potassium nitrate <sup>2</sup>	9.4	10.1	13.9	11.4
Other potassic fertilizer	.1	.2	0	0
Mixed and nonspecific fertilizer	21.8	25.6	27.3	28.0
Total	890.2	1,109.1	1,340.6	1,372.2

<sup>1</sup>Preliminary. <sup>2</sup>Includes potassium sodium nitrate.

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

ammonia and urea accounted for about 82 percent of the 1981/82 imports of nitrogen nutrients, about the same as in 1980/81. Ammonia made up about two-thirds of nitrogen imports, while urea accounted for 15 percent.

The USSR provided about a third of U.S. imports of anhydrous ammonia, down from about one-half in 1980/81. Imports from Mexico increased about 123 per-

**Table 7—U.S. exports of selected fertilizer materials, years ending June 30, 1979-82**

Material	1979	1980	1981	1982 <sup>2</sup>
<i>1,000 metric tons</i>				
Anhydrous ammonia	502	704	740	688
Urea	1,406	1,331	1,817	1,591
Ammonium nitrate	75	68	70	66
Ammonium sulfate	639	763	725	527
Sodium nitrate	252	20	13	68
Nitrogen solution	289	466	568	214
Other nitrogen fertilizer <sup>2</sup>	27	71	134	96
Phosphate rock	13,501	15,627	12,851	10,007
Normal superphosphate	26	29	27	17
Concentrated superphosphate	1,431	1,449	1,609	1,216
Diammonium phosphate	4,111	4,134	4,815	3,783
Other ammonium phosphate	426	524	526	265
Phosphoric acid	1,189	1,232	1,347	1,665
Other phosphatic fertilizer	25	13	17	16
Potassium chloride	1,058	1,079	950	640
Other potassic fertilizer	474	507	384	349
Mixed fertilizer	319	358	341	287
Total	25,550	28,375	26,934	21,495

<sup>1</sup>Preliminary. <sup>2</sup>Includes aqua ammonia.

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

**Table 8—U.S. fertilizer exports: Declared values of selected materials, years ending June 30, 1979-82**

Material	1979	1980	1981	1982 <sup>1</sup>
<i>Million dollars</i>				
Anhydrous ammonia	52.1	97.2	113.7	102.1
Urea	176.1	206.8	344.7	263.7
Ammonium nitrate	7.3	9.5	11.2	11.1
Ammonium sulfate	33.6	56.2	64.0	49.8
Sodium nitrate	25.5	1.5	0	3.4
Nitrogen solutions	13.5	45.7	64.8	41.6
Other nitrogen fertilizer <sup>2</sup>	10.9	7.7	19.1	10.5
Phosphate rock	373.2	496.1	489.1	402.0
Normal superphosphate	3.0	1.2	1.2	0.6
Concentrated superphosphate	147.6	238.2	291.7	182.0
Diammonium phosphate	602.0	848.1	1,021.4	710.4
Other ammonium phosphate	57.8	99.5	111.8	54.5
Phosphoric acid	172.2	255.9	377.7	532.4
Other phosphatic fertilizer	2.9	1.8	4.4	2.4
Potassium chloride	65.9	103.0	114.1	65.0
Other potassic fertilizer	37.1	53.5	50.9	51.9
Mixed fertilizer	59.6	74.9	92.7	70.4
Total	1,820.3	2,615.1	3,172.5	2,553.8

<sup>1</sup>Preliminary. <sup>2</sup>Includes aqua ammonia.

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

cent, while supplies from Canada rose 33 percent. Canada and Mexico each provided about one-fourth of U.S. 1981/82 imports of anhydrous ammonia. Although imports of urea from Canada declined 175,000 tons, that country remained the largest urea supplier, with 61 percent of U.S. imports. With a 102,000-ton gain over the

previous year, the Netherlands was the second ranking supplier. That country had 22 percent of U.S. urea imports.

After increasing for several years, U.S. nitrogen exports declined about 19 percent in 1981/82. The shares of anhydrous ammonia, urea, and diammonium phosphates ranged from 22 to 29 percent of nitrogen exports. The largest export tonnage of ammonia, about 44 percent, went to Turkey. India, the People's Republic of China (PRC), and Mexico purchased the most urea, with these countries accounting for about 47 percent of U.S. urea exports. India also bought the most diammonium phosphate, about 16 percent of U.S. exports. Belgium-Luxembourg, the PRC, Italy, and Mexico were also major diammonium phosphate buyers.

### Phosphate Exports Down

The United States again exported substantial quantities of phosphate in both intermediate and finished phosphate products, but because of depressed world demand and the strong U.S. dollar, exports were down from a year earlier. On a nutrient basis, phosphate exports (excluding phosphate rock) were down 17 percent, the first decline since 1969/70. Exports of phosphate rock, concentrated superphosphate, and diammonium phosphate were down more than 20 percent. At 1.74 million metric tons (P<sub>2</sub>O<sub>5</sub>), diammonium phosphate accounted for about 52 percent of U.S. exports of upgraded phosphate materials. Although exports of phosphoric acid increased, they accounted for less than one-third of U.S. sales of phosphates.

Exports of phosphoric acid materials increased about 24 percent in 1981/82, as sales to the USSR resumed after the embargo was lifted. The USSR replaced Brazil as the largest purchaser of U.S. phosphoric acid; exports to Brazil collapsed in the face of reduced demand and increased Brazilian production capacity.

With excess U.S. phosphate capacity, the 22-percent drop in imports had little impact on the availability of phosphate fertilizer materials. Declines in imports of phosphate rock from Morocco and diammonium phosphates from Canada were the major items affecting reduced imports.

### Potash Trade Declines

Potash imports dropped 13 percent in response to reduced domestic demand. Although down from 8.3 million tons, potassium chloride, at 7.2 million tons, was the largest potash import item. Canada provided about 91 percent of potassium chloride imports, enough to satisfy 80 percent of U.S. potash nutrient requirements in 1981/82. Israel was the only other significant supplier, increasing its potash shipments by 34 percent to 522,000 tons.

U.S. exports of potash were down 27 percent from a year earlier. Less than 1 million tons of potassium chloride and other potassic fertilizers were shipped in 1981/82.

### Farm Prices

Reduced demand and burdensome inventories early in the year caused phosphate prices to decline. Nitrogen prices, especially anhydrous ammonia, increased into the spring season, while potash prices remained stable.

Declines in producer prices for fertilizer materials were not reflected in the prices farmers paid; 1982 farm prices

**Table 9—Average prices paid by farmers per ton of selected fertilizers, United States; April 14 prices, 1972-76; May 15 prices, 1977-82; and October 15 prices, 1981-82**

Year	Anhydrous ammonia	Superphosphate		18-46-0 K <sub>2</sub> O	Potash 60 percent 6-24-24	Mixed fertilizer
		46 percent P <sub>2</sub> O <sub>5</sub>	20 percent P <sub>2</sub> O <sub>5</sub>			
Dollars						
1972	80.00	78.00	49.90	97.40	58.80	81.00
1973	87.60	87.50	53.70	109.00	61.50	88.00
1974	183.00	150.00	91.40	181.00	81.30	139.00
1975	265.00	214.00	118.00	263.00	102.00	186.00
1976	191.00	158.00	95.20	189.00	95.90	148.00
1977	188.00	148.00	103.00	185.00	96.90	145.00
1978	171.00	<sup>1</sup> 153.00	100.00	186.00	96.40	150.00
1979	182.00	<sup>1</sup> 172.00	111.00	210.00	112.00	161.00
1980	234.00	<sup>1</sup> 251.00	132.00	298.00	135.00	213.00
1981:						
May 15	247.00	<sup>1</sup> 249.00	140.00	283.00	155.00	226.00
Oct. 15	249.00	229.00	(2)	261.00	155.00	214.00
1982:						
May 15	255.00	<sup>1</sup> 228.00	(2)	262.00	155.00	219.00
Oct. 15	236.00	<sup>1</sup> 216.00	(2)	251.00	146.00	211.00

<sup>1</sup>Specifications changed to 44 percent-46 percent P<sub>2</sub>O<sub>5</sub>. <sup>2</sup>Discontinued.

Source: *Agricultural Prices*, USDA, SRS, Pr 1 (10-82) and earlier issues.

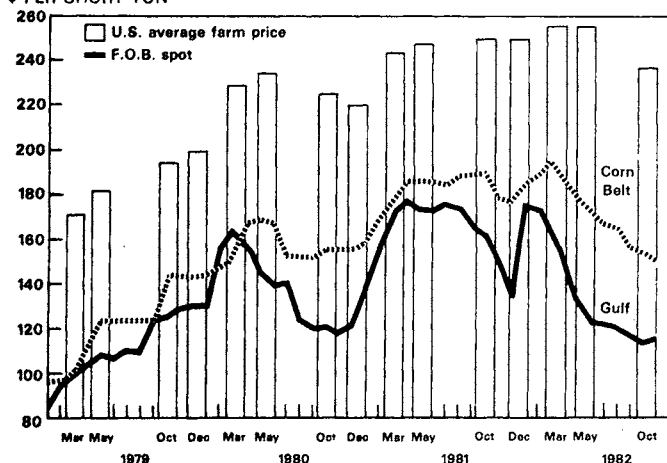
**Table 10—Average prices paid by farmers per 20-pound unit of nitrogen contained in nitrogenous materials, United States, 1972-82**

Year	Sulfate of ammonia	Ammonium nitrate	Urea	Anhydrous ammonia	Nitrogen solutions, percent N		
					28	30	32
Dollars							
1972	2.54	1.93	1.79	.98	1.85	1.84	1.96
1973	2.69	2.13	1.98	1.07	2.05	1.94	2.09
1974	5.37	4.15	4.02	2.23	4.11	3.70	3.97
1975	7.32	5.55	5.36	3.23	5.68	5.10	5.25
1976	4.79	4.03	3.65	2.32	3.89	3.77	4.09
1977	4.97	4.30	3.72	2.29	4.11	4.03	4.25
1978	5.20	4.14	3.70	2.08	3.96	3.90	4.14
1979	5.60	4.20	3.82	2.20	3.84	3.70	4.10
1980	6.74	5.04	4.96	2.86	4.82	4.40	4.90
1981							
May 15	7.56	5.74	5.32	3.02	5.00	4.96	5.56
Oct. 15	7.80	5.79	5.36	3.04	4.90	5.06	5.68
1982							
May 15	8.00	5.82	5.10	3.10	5.00	4.86	5.66
Oct. 15	7.86	5.70	4.96	2.88	4.90	4.90	5.64

Source: Computed from *Agricultural Prices*, USDA, SRS, Pr 1 (10-82) and earlier issues.

#### Anhydrous Ammonia Prices, 1979-82

\$ PER SHORT TON



were almost unchanged from a year earlier. Many dealers used lower prices from suppliers to offset increasing costs for other items in an attempt to maintain profit margins.

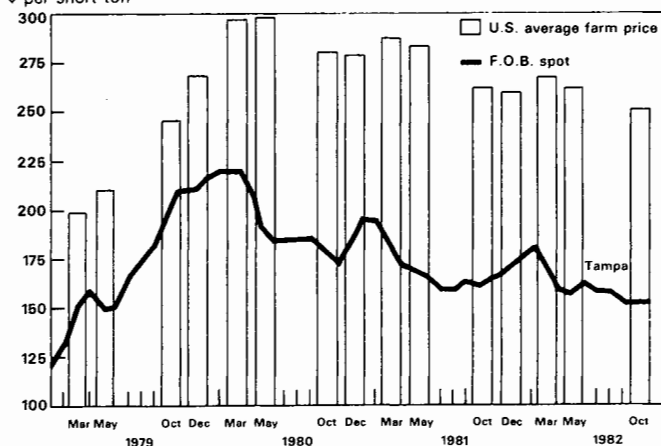
Overall nitrogen prices in spring 1982 were about the same as in spring 1981. Prices of anhydrous ammonia and ammonium nitrate were up about 3 percent, but these advances were offset by lower prices for urea and nitrogen solutions (tables 9 and 10). The prices of most nitrogen fertilizers have declined since spring 1982, with those for urea and anhydrous ammonia down the most for fall applications—8 and 5 percent, respectively.

Prices for phosphate fertilizer declined early in 1981/82 and remained stable for the rest of the year (tables 9 and 11). Prices fell again in fall 1982 in response to a slow season.

Potash prices were down slightly in fall 1981, but they advanced in spring 1982, rising to year-earlier levels (tables 9 and 11). Burdensome producer inventories and

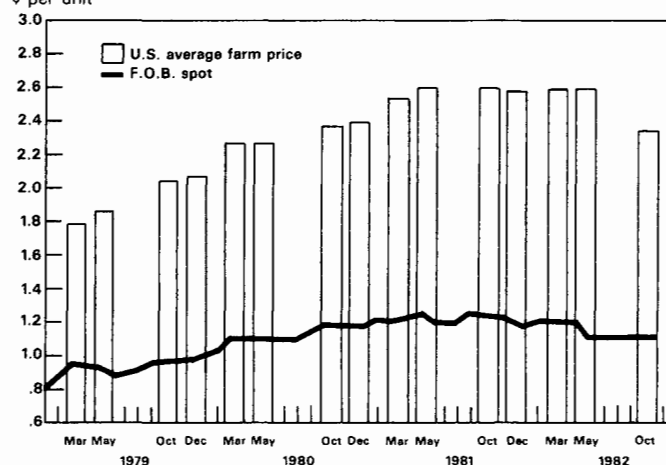
## Diammonium Phosphate Prices, 1979-82

\$ per short ton



## Potash Prices, 1979-82

\$ per unit



**Table 11—Average prices paid by farmers per 20-pound unit of  $P_2O_5$  contained in phosphate materials, and of  $K_2O$  in muriate of potash, United States, 1972-82**

Year	Superphosphate		Muriate of potash <sup>3</sup>
	Normal <sup>1</sup>	concentrated <sup>2</sup>	
<i>Dollars</i>			
1972	2.50	1.70	.98
1973	2.69	1.90	1.03
1974	4.57	3.26	1.36
1975	5.90	4.65	1.70
1976	4.76	3.43	1.60
1977	5.15	3.22	1.61
1978	5.00	3.38	1.62
1979	5.56	3.82	1.86
1980	6.60	5.58	2.26
1981			
May 15	7.00	5.42	2.58
Oct. 15	(4)	4.98	2.58
1982			
May 15	(4)	4.96	2.58
Oct. 15	(4)	4.70	2.44

<sup>1</sup>20 percent  $P_2O_5$ . <sup>2</sup>Until 1977, 46 percent  $P_2O_5$ . For 1977 and after, 44-46 percent  $P_2O_5$ . <sup>3</sup>60 percent  $K_2O$ . <sup>4</sup>Discontinued.

Source: Computed from *Agricultural Prices*, USDA, SRS, Pr 1 (10-82) and earlier issues.

a slow fall season caused October 1982 prices to drop 6 percent below those for May 1982.

## Fertilizer Use Estimates

In the year ending June 30, 1982, about 48.7 million tons of fertilizer materials were used in the United States and Puerto Rico (table 12). This represents a 10-percent decline from the 54 million tons consumed during 1980/81. The use of all primary nutrients was down 9 percent to about 21.5 million tons. Of these, nitrogen fell 7 percent to 11.1 million tons, while phosphate and potash each dropped 11 percent to 4.8 and 5.6 million tons, respectively.

The five leading States in order of total consumption and the changes in consumption from a year earlier were: Illinois, up 1 percent; Iowa, down 10 percent; California, down 17 percent; Indiana, down 5 percent; and Texas, down 17 percent.

During 1981/82, regional fertilizer use was down in all areas except the Mountain region. Fertilizer use fell the most in the Southern Plains and Southeast (table 13). Consumption of the individual plant nutrients—nitrogen, phosphate, and potash—followed total use patterns, with use up in the Mountain region and down in all others (tables 14, 15, and 16).

The proportion of fertilizers applied as mixtures declined to 43 percent of total use in 1981/82. Following a long-term trend, the proportion applied as direct applications increased to 57 percent of the total (table 17).

The annual update of fertilizer use by class has been discontinued. However, the latest data available indicate the proportion of total fertilizer tonnage applied in liquid form increased to 37 percent in 1981/82 (table 18). Dry bulk applications made up 51 percent, while the share of dry bagged materials declined to about 12 percent.

## Fertilizer Use on Crops - 1981/82

The lower fertilizer application rates in 1981/82 probably reflect depressed economic conditions in the farm sector. Low commodity prices, high interest rates, and farmers' cash flow problems generally encouraged smaller fertilizer applications on corn, soybeans, and wheat. Lower cotton prices affected fertilizer application rates for cotton, as farmers reduced acreage and concentrated on the more productive acres. Consequently, nitrogen and potash application rates increased in 1981/82, while the phosphate application rates remained at 1980/81 levels (table 19).

**Corn for grain.** Fertilization of the acreage of corn for grain took about 41 percent of the nitrogen, 39 percent of the phosphate, and 42 percent of the potash used by U.S. farmers in 1981/82. The nine States surveyed accounted for about 65 percent of the total acreage of corn harvested for grain in the United States. Of the fields surveyed in 1982, 97 percent of the acreage received some fertilizer, the same as a year earlier (table 20). The proportion of corn acres receiving each of the plant nutrients decreased, with phosphate decreasing the most.

In 1982, the nitrogen application rate was 131 pounds an acre, down more than 4 percent from 1981's record 137 pounds. Phosphate application rates, at 60 pounds per acre, declined the most—10 percent. Potash application rates, which fell 10 percent to 79 pounds an acre, outpaced the nitrogen decline.

**Cotton.** The 13 cotton-producing States surveyed for fertilizer use on cotton accounted for 63 percent to the total U.S. acreage harvested in 1982. Of the fields surveyed, 71 percent received some fertilizer, down from 75

**Table 12—All fertilizer: Total use and primary nutrient use, United States, 1967-1982<sup>1</sup>**

Year ended June 30	Total use	N	Available P <sub>2</sub> O <sub>5</sub>	Primary nutrient use		Index
				K <sub>2</sub> O	Total	
				1,000 tons		
						1977=100
1967	37,081	6,027.1	4,304.7	3,641.8	13,973.6	63.2
1968	38,743	6,787.6	4,453.3	3,792.6	15,033.5	68.0
1969	38,949	6,957.6	4,665.6	3,891.6	15,514.8	70.2
1970	39,589	7,459.0	4,573.9	4,035.5	16,068.3	72.7
1971	41,118	8,133.6	4,803.4	4,231.4	17,168.4	77.6
1972	41,206	8,022.3	4,863.7	4,326.4	17,212.8	77.8
1973	43,288	8,295.1	5,085.2	4,648.7	18,029.0	81.5
1974	47,094	9,157.2	5,098.6	5,082.6	19,338.4	87.5
1975	42,484	8,600.8	4,506.8	4,453.2	17,560.9	79.4
1976	49,189	10,411.6	5,227.6	5,209.7	20,848.8	94.3
1977	51,624	10,647.4	5,629.7	5,833.8	22,110.9	100.0
1978	47,497	9,964.6	5,096.1	5,526.1	20,586.9	93.1
1979	51,480	10,714.4	5,605.8	6,244.5	22,565.1	102.1
1980	52,787	11,406.7	5,431.5	6,245.1	23,083.3	104.4
1981	53,988	11,923.8	5,434.4	6,319.5	23,677.7	107.1
1982	48,733	11,078.9	4,818.2	5,614.0	21,511.1	97.3

<sup>1</sup>Includes Puerto Rico.

Source: Commercial Fertilizers, Consumption for Year Ended June 30, 1982, USDA, SRS, SpCr 7 (11-82) and earlier issues.

**Table 13—Total use of primary nutrients by regions, years ending June 30, 1981 and 1982<sup>1</sup>**

Region	1981 <sup>2</sup>	1982 <sup>2</sup>	Change
1,000 tons			Percent
Northeast	955	861	-10
Lake States	2,953	2,680	-9
Corn Belt	8,053	7,440	-8
Northern Plains	2,617	2,362	-10
Appalachian	1,877	1,720	-8
Southeast	1,965	1,699	-14
Delta States	1,054	936	-11
Southern Plains	1,665	1,418	-15
Mountain	927	968	+4
Pacific <sup>3</sup>	1,579	1,408	-11
United States	23,644	21,489	-9

<sup>1</sup>Excludes Puerto Rico. <sup>2</sup>Total may not add because of rounding.  
<sup>3</sup>Includes Alaska and Hawaii.

**Table 15—Use of phosphates as fertilizer, by regions, years ending June 30, 1981 and 1982<sup>1</sup>**

Region	1981 <sup>2</sup>	1982 <sup>2</sup>	Change
1,000 tons P <sub>2</sub> O <sub>5</sub>			Percent
Northeast	284	251	-12
Lake States	669	621	-7
Corn Belt	1,836	1,606	-12
Northern Plains	565	506	-10
Appalachian	494	438	-11
Southeast	409	342	-16
Delta States	214	177	-17
Southern Plains	389	329	-15
Mountain	244	262	+7
Pacific <sup>3</sup>	326	283	-13
United States	5,429	4,814	-11

<sup>1</sup>Excludes Puerto Rico. <sup>2</sup>Totals may not add because of rounding.  
<sup>3</sup>Includes Alaska and Hawaii.

**Table 14—Use of nitrogen as fertilizer, by regions, years ending June 30, 1981 and 1982<sup>1</sup>**

Region	1981 <sup>2</sup>	1982 <sup>2</sup>	Change
1,000 tons N			Percent
Northeast	349	328	-6
Lake States	1,183	1,086	-8
Corn Belt	3,512	3,395	-3
Northern Plains	1,890	1,720	-9
Appalachian	735	679	-8
Southeast	820	724	-12
Delta States	565	530	-6
Southern Plains	1,120	959	-14
Mountain	649	671	+3
Pacific <sup>3</sup>	1,085	978	-10
United States	11,908	11,068	-7

<sup>1</sup>Excludes Puerto Rico. <sup>2</sup>Totals may not add because of rounding.  
<sup>3</sup>Includes Alaska and Hawaii.

**Table 16—Use of potash as fertilizer, by regions, years ending June 30, 1981 and 1982<sup>1</sup>**

Region	1981 <sup>2</sup>	1982 <sup>2</sup>	Change
1,000 tons K <sub>2</sub> O			Percent
Northeast	322	282	-12
Lake States	1,101	973	-12
Corn Belt	2,705	2,439	-10
Northern Plains	162	136	-16
Appalachian	648	603	-7
Southeast	736	633	-14
Delta States	275	229	-17
Southern Plains	156	130	-17
Mountain	34	35	+3
Pacific <sup>3</sup>	168	147	-12
United States	6,307	5,607	-11

<sup>1</sup>Excludes Puerto Rico. <sup>2</sup>Totals may not add because of rounding.  
<sup>3</sup>Includes Alaska and Hawaii.

**Table 17—All fertilizer: Mixtures and direct-application materials used, average 1961-1970, annual 1971-1982, United States<sup>1</sup>**

Year ending June 30	All fertilizer	Mixtures <sup>2</sup>		Materials	
		Quantity	Percentage of total	Quantity	Percentage of total
		1,000 tons	Percent	1,000 tons	Percent
1961-1965	28,455	16,929	59	11,526	41
1966-1970	47,598	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	42
1976	49,189	22,958	47	26,231	53
1977	51,624	24,099	47	27,524	53
1978	47,497	22,110	47	25,387	53
1979	51,480	23,742	46	27,739	54
1980	52,787	23,270	44	29,517	56
1981	53,988	23,525	44	30,463	56
1982	48,733	20,815	43	27,918	57

<sup>1</sup>Includes Puerto Rico. <sup>2</sup>Primary nutrients plus secondary and micronutrient materials not included in commercial mixtures.

Source: *Commercial Fertilizers*, consumption for year ended June 30, 1981, USDA, SRS, SpCr 7 (11-82) and earlier issues. *Commercial Fertilizers, Consumption of Commercial Fertilizers, Primary Plant Nutrients, and Micronutrients*, USDA, SRS, Statistical Bulletin No. 472.

**Table 18—All fertilizers: Use by class, mixtures, and direct application materials, 1971-1981<sup>1, 2</sup>**

Year ending June 30	Dry bagged		Dry bulk		Fluid	
	1,000 tons	Percent	1,000 tons	Percent	1,000 tons	Percent
1971	11,500.0	29	16,931.7	43	11,131.8	28
1972	11,242.0	28	17,463.7	44	10,839.7	27
1973	10,544.8	25	20,153.6	48	11,124.0	27
1974	10,482.4	23	21,836.7	49	12,645.3	28
1975	9,044.1	22	19,372.6	48	12,189.3	30
1976	8,555.8	18	23,409.6	50	14,927.8	32
1977	8,264.1	17	25,154.0	51	15,680.4	32
1978	7,491.1	17	23,423.9	51	14,706.1	32
1979	7,173.5	15	25,840.5	52	16,327.7	33
1980	6,753.1	14	25,890.8	51	17,847.2	35
1981	6,176.4	12	26,337.8	51	18,679.8	37

<sup>1</sup>Data for 1973 and later include Alaska, Hawaii, and Puerto Rico. <sup>2</sup>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 ending June 30, 1981, USDA, SRS, SpCr 7 (81) and earlier issues.

percent in 1981. Compared with 1981, the proportion of cotton acreage fertilized with nitrogen and phosphate decreased to 71 and 41 percent, respectively. The proportion fertilized with potash remained the same (table 21). The pounds of nitrogen and potash applied per acre averaged above year-earlier quantities. The amount of nitrogen applied averaged 82 pounds per acre and potash 55 pounds. Phosphate use remained at 46 pounds an acre.

**Soybeans for beans.** The 14 States surveyed for fertilizer use on soybeans in 1982 accounted for about 73 percent of total U.S. harvested acreage. Of the fields surveyed, the proportion of acreage receiving fertilizer declined for the third successive year—to 32 percent (table 22). The proportion of acreage receiving nitrogen declined to 20 percent, phosphate to 29 percent, and potash to 31 percent.

Nitrogen use was down 1 pound to 17 pounds an acre. The phosphate application rate declined 12 percent to 41 pounds, and potash use dropped 13 percent to 66 pounds.

**All wheat.** The 14 States surveyed for fertilizer use on wheat accounted for 83 percent of total U.S. harvested

acreage. For nitrogen and phosphates, fertilizer application rates on wheat showed a smaller decline than for corn and soybeans, but a larger decline for potash. Of the fields surveyed, 69 percent received some fertilizer, down 1 percent from 1981 (table 23). The share of wheat acreage receiving nitrogen also declined 1 percent, while the acres receiving phosphate and potash each decreased 3 percent.

Applications of nitrogen per acre were even with 1981, at 58 pounds. Phosphate use per acre was down 3 pounds, while potash use was off 21 percent to 37 pounds an acre.

## WORLD FERTILIZER REVIEW AND PROSPECTS

Preliminary estimates indicate that world fertilizer consumption in 1981/82 increased about 1 percent to about 117.4 million metric tons, well below the 3- to 7-percent annual gains shown since 1974/75 (table 24).

**Table 19—Estimates of fertilizers used on harvested acres of corn for grain, cotton, soybeans, and all wheat, United States, 1978-82**

Crop and year	Acres receiving				Rates per acre receiving			Total U.S. harvested acreage <sup>1</sup>
	Any fertilizer	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	
		Percent			Pound			1,000 acres
Corn								
1978	95	95	87	81	126	68	80	71,930
1979	96	96	89	82	135	69	84	72,400
1980	96	96	87	81	130	66	86	73,030
1981	97	97	90	84	137	67	86	74,624
1982	97	96	86	82	131	60	79	72,823
Cotton								
1978	69	69	45	31	76	54	54	12,400
1979	71	71	48	27	71	50	44	12,831
1980	71	71	48	30	72	46	46	13,215
1981	75	75	52	30	72	46	46	13,841
1982	71	71	41	30	82	46	55	9,298
Soybeans								
1978	37	25	35	36	17	45	62	63,663
1979	40	26	38	39	16	46	67	70,566
1980	37	23	35	36	17	46	70	67,856
1981	36	21	33	35	18	46	76	66,368
1982	32	20	29	31	17	41	66	70,920
All wheat								
1978	61	61	38	16	52	35	34	56,495
1979	66	65	44	18	54	38	43	62,454
1980	67	67	43	18	58	39	40	70,984
1981	70	70	47	20	58	39	47	80,948
1982	69	69	44	17	58	36	37	78,964

<sup>1</sup>Crop Production, CrPr 2-2 (10-82), Crop Reporting Board, SRS, USDA, October 12, 1982, and Crop Production, 1981 Annual Summary, CrPr 2-1 (82), Crop Reporting Board, SRS, USDA, January 15, 1982.

**Table 20—Fertilizer use on corn acreage harvested for grain, selected States, 1982**

State	Acres receiving						Rate per acre receiving			Acres fertilized <sup>1</sup>		
	Acres for harvest <sup>2</sup>	Fields in survey	Any fertil- izer	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	Number		Percent			Pounds			Percent		
Michigan	2,800	93	100.0	100.0	95.7	98.9	120.2	65.3	91.8	48.4	10.8	50.5
Minnesota	6,350	149	96.6	96.6	90.6	89.9	110.3	50.7	69.4	81.3	13.9	17.4
Wisconsin	3,450	128	97.7	96.9	96.1	96.1	95.2	57.3	90.6	67.2	16.0	31.2
3 States	12,600	370	97.7	97.5	93.2	93.6	108.4	55.9	80.6	69.9	13.8	28.7
Indiana	6,300	181	100.0	98.9	98.3	95.6	151.7	68.8	105.9	61.3	0.0	38.7
Iowa	13,200	215	98.6	98.6	89.8	88.8	131.3	65.8	75.2	91.0	1.4	7.6
Missouri	1,930	123	97.6	96.7	87.0	88.6	124.9	56.6	67.0	86.7	0.8	12.5
Ohio	4,100	156	98.7	98.7	97.4	96.2	160.9	71.3	103.9	59.1	2.6	38.3
4 States	25,530	675	98.9	98.6	92.9	91.7	140.6	66.8	87.4	78.2	1.2	20.6
Nebraska	6,900	168	97.1	97.1	60.7	38.0	144.5	37.2	16.6	74.2	4.3	21.5
South Dakota	2,300	85	61.2	61.2	49.4	31.8	77.9	35.8	20.4	80.8	5.8	13.4
2 States	9,200	253	88.1	88.1	57.9	36.5	132.9	36.9	17.4	75.4	4.5	20.1
9 States	47,330	1,298	96.5	96.2	86.2	81.5	130.6	59.8	79.2	75.5	1.8	22.7

<sup>1</sup>Percentages apply to acres receiving fertilizer. <sup>2</sup>Crop Production, CrPr 2-2, (10-82), Crop Reporting Board, SRS, USDA, October 13, 1982.

**Table 21 — Fertilizer use on cotton acreage harvested, selected States, 1982**

State	Acres for harvest <sup>2</sup>	Fields in survey	Acres receiving				Rate per acre receiving			Acres fertilized <sup>1</sup>		
			Any ferti- lizer	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	Number		Percent			Pounds			Percent		
Missouri	165	41	100.0	100.0	82.9	82.9	53.5	31.3	80.0	48.8	17.1	78.1
Tennessee	250	99	97.0	97.0	97.0	97.0	67.1	62.3	68.1	77.1	0.0	22.9
Alabama	300	99	100.0	100.0	92.9	92.9	101.2	64.8	72.3	71.7	0.0	28.3
Georgia	175	59	100.0	100.0	89.8	100.0	79.3	52.8	89.3	13.6	0.0	86.4
South Carolina	103	58	100.0	100.0	82.8	86.2	83.7	43.8	83.9	15.5	3.5	81.0
3 States	578	216	100.0	100.0	90.3	94.0	91.6	58.0	79.6	44.5	0.6	54.9
Arkansas	425	192	100.0	97.4	68.2	71.9	67.0	36.2	48.2	51.6	14.1	34.3
Louisiana	605	94	100.0	97.9	73.4	72.3	73.7	47.1	53.3	56.4	24.5	19.2
Mississippi	1,050	294	100.0	99.7	40.8	41.2	93.9	53.5	65.0	57.5	12.6	29.9
3 States	2,080	580	100.0	98.7	55.9	56.5	82.7	46.8	56.3	56.0	16.3	27.7
Oklahoma	440	81	43.2	43.2	18.5	14.8	34.1	28.7	23.0	97.1	0.0	2.9
Texas	3,720	528	38.7	38.7	27.6	13.4	40.5	30.3	19.7	70.6	18.3	11.1
2 States	4,160	609	39.2	39.2	26.6	13.6	39.7	30.2	20.1	73.7	16.2	10.1
Arizona	533	99	94.9	93.9	35.4	3.0	126.3	58.5	33.5	3.2	59.6	37.2
New Mexico	74	78	48.7	47.4	29.5	7.7	64.2	56.7	37.0	73.7	23.7	2.6
2 States	607	177	89.3	88.3	34.6	3.6	122.2	58.3	34.4	7.9	57.2	34.9
California	1,370	248	95.1	95.1	29.9	3.8	116.8	61.4	38.6	23.3	35.4	41.3
13 States	9,210	1,970	71.0	70.6	41.1	29.7	81.5	46.1	55.1	48.4	21.5	30.1

<sup>1</sup>Percentages apply to acres receiving fertilizer. <sup>2</sup>Crop Production, CrPr 2-2, (10-82), Crop Reporting Board, SRS, USDA, October 13, 1982.

**Table 22 — Fertilizer use on soybean acreage harvested for beans, selected States, 1982**

State	Acres for harvest <sup>2</sup>	Fields in survey	Any fertilizer	Acres receiving			Rate per acre receiving			Acres fertilized <sup>1</sup>		
				N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	At or before seeding	After seeding	At or before and after seeding
	1,000 acres	Number		Percent			Pounds			Percent		
Minnesota	4,850	93	12.9	9.7	10.8	10.8	13.4	29.7	51.9	91.7	8.3	0.0
Indiana	4,550	117	45.3	24.8	34.2	44.4	10.7	39.4	86.6	100.0	0.0	0.0
Iowa	8,150	143	9.8	4.9	7.7	9.1	31.9	54.2	64.3	100.0	0.0	0.0
Missouri	5,850	150	24.7	14.7	22.7	24.0	20.6	44.5	66.3	91.9	5.4	2.7
Ohio	3,730	116	39.7	24.1	34.5	37.9	10.0	43.4	70.5	95.7	0.0	4.3
4 States	22,280	526	25.7	14.6	21.3	24.8	15.8	43.9	74.4	96.9	1.3	1.8
Nebraska	2,300	61	27.9	21.3	23.0	14.8	23.3	28.7	14.1	94.1	5.9	0.0
North Carolina	2,050	64	53.1	43.8	50.0	53.1	16.3	38.7	70.8	97.1	2.9	0.0
Tennessee	2,350	75	62.7	33.3	62.7	62.7	14.2	42.7	55.3	95.7	4.3	0.0
2 States	4,400	139	58.2	38.2	56.8	58.2	15.3	41.1	61.9	96.3	3.7	0.0
Alabama	2,050	63	65.1	49.2	60.3	65.1	19.1	48.8	60.3	100.0	0.0	0.0
Georgia	2,600	67	55.2	46.3	55.2	55.2	20.3	37.9	67.4	89.2	8.1	2.7
South Carolina	1,850	68	58.8	39.7	54.4	58.8	20.0	37.3	78.7	92.5	5.0	2.5
3 States	6,500	198	59.4	45.3	56.6	59.4	19.8	41.4	68.1	93.9	4.4	1.7
Arkansas	4,600	138	21.7	11.6	21.0	21.0	17.3	38.3	49.4	100.0	0.0	0.0
Louisiana	2,950	101	31.7	8.9	31.7	31.7	17.2	47.1	60.3	96.9	3.1	0.0
Mississippi	3,600	112	34.8	12.5	34.8	33.9	15.3	40.7	59.9	97.4	2.6	0.0
3 States	11,150	351	28.6	11.2	28.3	28.0	16.5	41.9	56.8	96.1	1.9	0.0
14 States	51,480	1,368	32.2	19.5	29.3	30.9	17.2	41.4	65.5	96.0	3.0	1.0

<sup>1</sup>Percentages apply to acres receiving fertilizer. <sup>2</sup>Crop Production, CrPr 2-2 (11-81), Crop Reporting Board, SRS, USDA, October 13, 1982

**Table 23—Fertilizer use on wheat acreage harvested, selected States, 1982<sup>1</sup>**

State	Acres receiving						Rate per acre receiving			Acres fertilized <sup>1</sup>		
	Acres for harvest <sup>2</sup>	Fields in survey	Any fertil- izer	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	At or before seeding	After seeding	At or before and after seeding
	<i>1,000 acres</i>	<i>Number</i>		<i>Percent</i>			<i>Pounds</i>			<i>Percent</i>		
Michigan	640	47	100.0	97.9	95.7	97.9	54.1	57.3	58.8	42.6	12.8	44.6
Minnesota	3,184	65	98.5	96.9	84.6	64.6	60.7	34.2	26.3	98.4	0.0	1.6
2 States	3,824	112	98.7	97.1	86.5	70.2	59.6	38.5	33.9	89.0	2.1	8.9
Indiana	1,080	64	93.8	93.8	90.6	89.1	79.5	60.0	65.6	15.0	10.0	75.0
Missouri	2,200	94	93.6	93.6	80.9	81.9	68.5	45.4	54.9	54.5	17.1	28.4
Ohio	1,250	81	84.0	84.0	81.5	81.5	65.0	60.4	65.1	23.5	13.3	63.2
3 States	4,530	239	91.0	91.0	83.4	83.5	70.3	53.2	60.4	36.9	14.4	48.7
Kansas	13,200	267	74.9	74.9	39.7	7.5	55.5	35.3	26.7	74.0	8.0	18.0
Nebraska	2,950	112	56.3	56.3	21.4	4.5	47.1	32.0	15.8	92.0	6.4	1.6
North Carolina	10,545	222	67.1	67.1	54.1	8.1	41.4	25.9	10.6	98.7	0.7	0.6
South Dakota	3,545	75	34.7	34.7	22.7	2.7	36.8	23.1	10.4	100.0	0.0	0.0
4 States	30,240	676	65.7	65.7	40.9	6.8	48.6	30.0	18.6	85.9	4.8	9.3
Oklahoma	6,900	179	81.0	81.0	48.6	17.3	62.8	34.8	16.6	65.5	7.6	26.9
Texas	6,000	186	55.2	55.2	36.0	10.9	82.6	38.7	21.8	52.5	9.0	38.5
2 States	12,900	365	69.0	69.0	42.7	14.3	70.2	36.3	18.4	60.7	8.1	31.2
Colorado	3,097	78	34.6	34.6	1.3	0.0	35.8	27.6	0.0	92.6	3.7	3.7
Idaho	1,500	145	82.7	82.1	29.8	8.0	98.9	35.9	22.3	52.2	16.2	31.6
Montana	5,405	178	48.3	48.3	46.1	4.5	28.9	30.8	15.6	76.7	3.5	19.8
3 States	10,002	401	49.3	49.2	29.9	3.6	48.0	31.6	17.8	73.9	6.8	19.3
Oregon	1,200	109	95.4	95.4	14.7	8.3	64.6	32.7	31.0	66.4	8.6	25.0
Washington	2,840	150	97.3	97.3	14.7	2.0	82.0	31.9	41.7	70.5	6.2	23.3
2 States	4,040	259	96.8	96.8	14.7	3.9	76.8	32.1	34.8	69.3	6.9	23.8
16 States	65,536	2,052	69.3	69.2	43.7	16.7	57.9	35.5	37.0	74.1	6.5	19.4

<sup>1</sup>Percentages apply to acres receiving fertilizer. <sup>2</sup>Crop Production, CrPr 2-2 (10-82), Crop Reporting Board, SRS, USDA, October 13, 1982.

**Table 24—World consumption of fertilizer, 1980/81 and 1981/82**

Nutrient	Actual 1980/81	Estimate 1981/82
<i>Million metric tons</i>		
N	60.34	61.50
P <sub>2</sub> O <sub>5</sub>	31.49	31.56
K <sub>2</sub> O	24.26	24.35
Total	116.09	117.41

Source: Actual, FAO. Estimated, FAO/UNIDO/World Bank Fertilizer Working Group, September 1982.

Plentiful supplies and lower-than-expected use kept a downward pressure on fertilizer prices in most of the world throughout 1981/82 (table 25). Because of a spring 1982 recovery, anhydrous ammonia prices exhibited the most strength. Diammonium phosphate and triple superphosphate prices also exhibited some recovery in fall 1981 and spring 1982. Potash prices generally trended lower, with periods of stable prices. Fertilizer prices recovered or remained stable only when seasonal use was greatest or in response to production facilities closing.

Earlier projections by the Food and Agricultural Organization/United Nations Industrial Development Organization/World Bank Fertilizer Working Group indicated a 5-percent increase in 1982/83 fertilizer consump-

tion compared with a year earlier—to about 124 million metric nutrient tons. However, the economic conditions that contributed to lower-than-expected fertilizer consumption in 1981/82 are carrying over into 1982/83, and world use will likely fall below these projections. World fertilizer consumption in 1982/83 could increase slightly from last year's 117.4 million metric tons.

There is considerable uncertainty about the world economic situation and crop developments. In many countries, sluggish economies are limiting import demand for foodstuffs and raw materials, and economic growth rates are expected to remain low through 1983. However, inflation is beginning to moderate in most developed countries. Interest rates have trended downward recently, but the outlook for 1983 is uncertain. The U.S. dollar has remained strong relative to other currencies. Also, the lack of foreign exchange is forcing many countries to restrict imports.

## WORLD SUPPLY-DEMAND FORECASTS TO 1986/87

World supplies of nitrogen, phosphate, and potash fertilizers should be adequate to meet expected demand through 1986/87. The Fertilizer Working Group recently forecast that a surplus supply capability would prevail for the three nutrients through 1986/87. Supply and

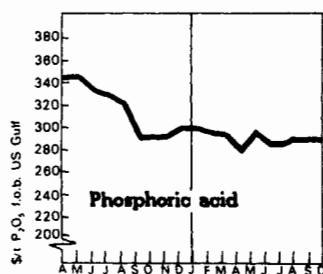
**Table 25—International spot prices for principal fertilizers and raw materials, 1981/82**

Product/origin	January 5, 1981	June 29, 1981	January 4, 1982	June 28, 1982	November 22, 1982
<i>Dollars per metric ton<sup>1</sup></i>					
Anhydrous ammonia					
W. Europe	180-185	<sup>2</sup> 215-725	<sup>2</sup> 197-199	<sup>2</sup> 170-180	<sup>2</sup> 148-150
U.S. Gulf	132-138	180-190	140-145	140-143	126-130
Urea					
W. Europe	210-215	<sup>3</sup> 205-210	<sup>2</sup> 156	<sup>2</sup> 140-150	<sup>2</sup> 128-131
U.S. Gulf	193-198	187-192	141-143	122-130	120-122
Muriate of potash (standard grade)					
W. Europe	120-125	120-124	93	70-73	71-72
Canada	110-120	113-120	93-96	70-80	70-75
Phosphoric acid (100% P <sub>2</sub> O <sub>5</sub> )					
U.S. Gulf	370-375	345-350	328-335	289-290	289-300
Morocco	380-400	380-400	380-400	380-400	330-360
Diammonium phosphate (DAP)					
U.S. Gulf	220-230	177-180	198-202	176-178	165-167
Tunisia	280	240-250	240-250	215-234	190-198
Concentrated superphosphate (TSP)					
U.S. Gulf	192-198	144-150	138-142	134-136	130-132
Tunisia	237-240	237-240	210-215	150	155-160
Sulfur (solid)					
W. Europe	125-135	125-135	143-147	133-140	133-140
Canada	110-120	125-130	110	110	104-106

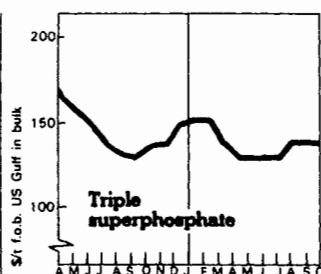
<sup>1</sup>Prices quoted are f.o.b. bulk unless otherwise noted. <sup>2</sup>C.I.F. <sup>3</sup>Bagged.

Source: Green Markets.

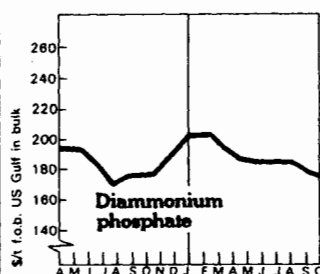
## Recent International Price Trends for Principal Fertilizers, 1981-82



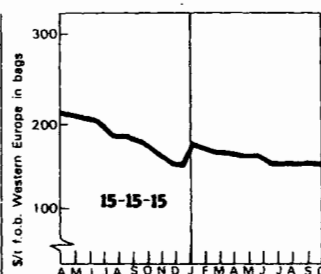
There is little new activity on the spot market, Turkey being the only market to import phosphoric acid regularly on a spot basis at around \$350-360/t P<sub>2</sub>O<sub>5</sub>. The Brazilian market is still closed to imports.



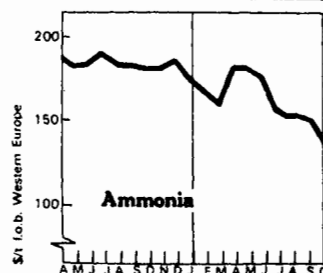
In the CFC Sri Lanka tender for 15,000 tonnes bagged TSP, offers based on product from South Africa, Senegal and Morocco were all below \$155/t f.o.b.



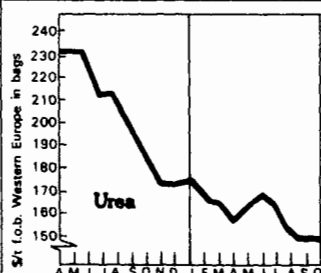
Prices have weakened further in the absence of any substantial business. Scentrade sold 25,000 tonnes bulk DAP to a number of West German buyers with a netback below \$167/t f.o.b.



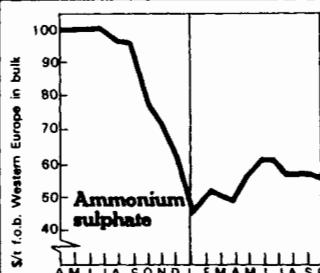
In the Cameroons, Bolissal/Superfos are reported to have been awarded 30,000 tonnes bagged 20-10-10 at approximately \$222/t for delivery ex-warehouse.



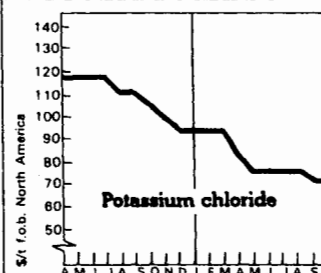
In Turkey the Akdeniz Gubre tender for 15,000 tonnes was awarded to Transammonia at \$154/t c.&f. including credit.



MMTC has purchased a total of 215,000 tonnes bulk urea, with EEC funds, from Nitrex, Windmill and Anicet prices ranging from \$128-131/t f.o.b.



Awards in the Cameroons tender for 40,000 tonnes bagged ammonium sulphate are understood to have been made to TFC (28,000 tonnes) and to Nitrex (10,000 tonnes) at approximately \$139/t for delivery ex-warehouse.



Potash prices appear to be stabilizing although MMTC rejected offers from Canpotex at \$72.50/t f.o.b. Vancouver.

Source: British Sulphur Corporation, Fertilizer Internal International, No. 162, December 1982, p. 2.

**Table 26—Forecast world consumption growth for fertilizer, 1980/81 to 1986/87 (Compound annual growth rates)**

Nutrient	Developed market economies	Developing market economies	Centrally planned economies	Total world
<i>Percent</i>				
N	3.1	6.4	3.3	3.8
P <sub>2</sub> O <sub>5</sub>	1.7	6.9	4.5	3.9
K <sub>2</sub> O	2.1	3.7	5.1	3.5

Source: FAO/UNIDO/World Bank Fertilizer Working Group, September 1982.

demand will balance, however, and apparent surpluses will require adjustment in production and capacity utilization.

### Demand Still Expected To Grow

Although depressed world economic conditions are slowing fertilizer production and use in 1982/83, world population growth and government policies aimed at expanding food production call for greater fertilizer use in the future. World demand for fertilizer from 1980/81 through 1986/87 is forecast to grow at annual compound rates of 3.8 percent for nitrogen, 3.9 percent for phosphate, and 3.5 percent for potash (table 26). Nitrogen demand is expected to reach 76 million metric tons in 1986/87, while the demand for phosphate and potash is forecast at about 40 and 30 million, respectively.

Consumption of nitrogen and phosphate should grow fastest in developing market economies, with the greatest increase expected for phosphate (table 27). Strong growth rates for phosphate and potash are also forecast for centrally planned economies. Developed

market economies with low population growth and relatively high and stable levels of food production can expect the slowest long-term growth in fertilizer consumption. Developed countries will lose consumption shares for the three nutrients, while developing countries' shares will increase for all three. Centrally planned economies will likely account for a smaller share of world nitrogen use, but a larger share of phosphate and potash consumption. Western Europe and North America will account for a relatively smaller share of the world nitrogen market. On the other hand, Asia and Latin America will account for a larger one. Also growth in phosphate and potash use is foreseen for Eastern Europe.

### Supply Capability To Expand the Most In Developing Nations

The world nitrogen supply is projected to expand at a compound annual rate of 4.2 percent through 1986/87 reaching almost 78 million tons that year. Phosphate capacity is expected to grow at a 3.2-percent annual rate attaining 41 million tons in 1986/87. Growth in the potash supply capability will slow midway through the forecast period, averaging 6.4 percent over the 5-year period and reaching about 33 million tons. For all nutrients, developed market economies will experience the slowest rates of growth in supply capability, while capabilities in developing countries will expand the most rapidly (table 28).

Growth in nitrogen supply capabilities in developed countries is expected to slow, with their current two-fifths share dropping to about one-third by 1986/87 (table 29). Developing countries will attempt to obtain self-sufficiency in nitrogen production, increasing their share of world production capability from the present 10 percent to over 22 percent in 5 years. Asia will account for about one-half of the 18.2 million tons of production

**Table 27—Forecast changes in regional shares of world fertilizer consumption, 1980/81 to 1986/87**

Region	Nitrogen		Phosphate		Potash	
	1980/81	1986/87	1980/81	1986/87	1980/81	1986/87
<i>Percent</i>						
North America	19.0	18.8	17.6	15.0	24.9	22.7
Western Europe	16.7	15.1	17.8	15.1	21.9	20.1
Oceania	0.4	0.4	3.3	3.6	0.9	0.9
Other developed market economies	1.9	1.8	3.7	3.9	2.8	3.0
Total developed market economies <sup>1</sup>	37.5	36.2	42.9	37.6	50.5	46.7
Africa	1.2	1.3	1.7	1.8	1.0	1.2
Latin America	4.7	4.8	8.8	9.5	7.7	7.4
Middle East	3.0	3.4	3.3	4.0	0.3	0.3
Asia	10.9	13.3	7.0	9.4	5.2	5.6
Total developing marketing economies <sup>1</sup>	19.7	22.9	20.8	24.7	14.3	14.5
Communist Asia	21.1	18.5	9.3	9.6	2.4	3.0
Eastern Europe and USSR	20.8	22.4	27.0	28.1	32.9	35.8
Total centrally planned economies <sup>1</sup>	41.9	40.9	36.3	37.7	35.3	38.8

<sup>1</sup>Totals may not equal sum of separate regions because of rounding.

Source: FAO/UNIDO/World Bank Fertilizer Working Group, June 1981 and September 1982.

**Table 28—Forecast growth in world supply capability for fertilizer, 1981/82 to 1986/87 (Compound annual growth rates)**

Nutrient	Developed market economies	Developing market economies	Centrally planned economies	Total world
	<i>Percent</i>			
N	1.5	10.8	3.9	4.2
P <sub>2</sub> O <sub>5</sub>	0.8	8.7	4.5	3.2
K <sub>2</sub> O	5.5	(1)	6.4	6.4

<sup>1</sup>Potash supply capability in developing market economies was negligible in 1980/81.

Source: FAO/UNIDO/ World Bank Fertilizer Working Group, September 1982.

capability to be added in the next 5 years, with India and Indonesia expected to figure strongly in the growth. Much of the remaining expansion in nitrogen capacity will take place in the energy-rich nations in the Middle East and Latin America. The centrally planned countries are expected to add almost 6 million tons of nitrogen production capacity by 1986/87. Eastern Europe and the Soviet Union will add about 4.8 million tons, while the remainder will be in communist Asia.

More phosphate production capacity will be added in the developing and centrally planned countries than in the developed nations. The developed countries will account for less than one-half of the world's phosphate capability. Developing countries in North Africa and Middle East will gain the most.

Potash supply capability in 1986/87 will remain concentrated in North America, and Eastern Europe and the USSR. About 78 percent of the world's potential potash supplies will originate in these regions. Western Europe will supply relatively less of the world's potash, losing about 4 percentage points as old potash mines in this region are depleted. A new producing region in the Middle East, with projected capability of supplying slightly over 1 percent of the world's potash, will have a minimal impact on world supplies.

## Interregional Fertilizer Trade: Changing Patterns

Significant changes in world fertilizer trade patterns will occur in the next 5 years. About 11.5 million metric tons of plant nutrients were transferred through interregional trade in 1980/81. This is forecast to reach 16.2 million by 1986/87. Potash is expected to be the most heavily traded nutrient by 1986/87. Currently, nitrogen is the top-ranked item.

### Nitrogen Trade To Stabilize

Nitrogen trade in 1986/87 is expected to be about 4.6 million tons (N), down from 5.6 million in 1980/81. Growth in nitrogen trade has slowed, primarily because of smaller deficits in Latin America and Asia. Large capacity additions in Latin America and the Middle East are enabling these regions to become self-sufficient. In 1980/81, nitrogen consumption barely exceeded production in Latin America. By 1986/87, capacity additions—primarily in Mexico, Trinidad-Tobago, and Brazil—will enable those regions to potentially export about 0.7 million tons. The Middle East will shift from a balanced nitrogen trade position to a potential export capability of 0.7 million tons. Increased self-sufficiency will reduce Asia's imports from almost 2 million tons to about 1.1 million in 5 years. However, the deficit in communist Asia is expected to increase 0.5 million tons, reaching 2.2 million in 1986/87. Expansion in Eastern Europe and the USSR, primarily the USSR, will raise these areas' surplus nitrogen capacities to over 5 million tons combined in 1986/87.

North America, currently a net nitrogen-exporting region, is forecast to become a net importer by the mid-1980's. North America exported over 0.5 million tons of nitrogen in excess of its own needs in 1980/81. By 1986/87, the region will need to import about this amount.

**Table 29—Forecast changes in regional shares of world fertilizer supply capability, 1980/81 to 1986/87**

Region	Nitrogen		Phosphate		Potash	
	1980/81	1986/87	1980/81	1986/87	1980/81	1986/87
	<i>Percent</i>					
North America	20.7	17.6	28.7	26.4	31.9	33.2
Western Europe	15.7	14.2	17.1	14.3	20.1	16.3
Oceania	0.3	0.3	3.7	3.4	0.0	0.0
Other developed market economies	2.3	1.8	5.1	4.3	3.5	3.7
Total developed market economies <sup>1</sup>	39.0	33.9	54.5	48.3	55.5	53.2
Africa	0.1	0.9	4.7	6.6	0.0	0.0
Latin America	4.4	5.6	4.1	4.8	0.1	0.7
Middle East	3.1	4.2	1.9	3.5	0.0	1.4
Asia	8.5	11.6	4.0	4.2	0.0	0.0
Total developing market economies <sup>1</sup>	16.0	22.3	14.7	19.0	0.1	2.1
Communist Asia	17.2	15.3	7.9	8.0	0.1	0.1
Eastern Europe and USSR	27.8	28.5	22.9	24.7	44.3	44.6
Total centrally planned economies <sup>1</sup>	45.0	43.8	30.7	32.7	44.4	44.6

<sup>1</sup>Totals may not equal sum of separate regions because of rounding.

Source: FAO/UNIDO/World Bank Fertilizer Working Group, Sept. 1982

### Phosphate Trade Should Increase

In 1980/81, about 1.7 million metric tons of phosphate fertilizers (including phosphoric acid) were sold in interregional trade. By 1986/87, this volume could increase to 5.7 million tons. The import needs of Latin America and Asia are forecast to increase the most.

As in recent years, most of the upgraded phosphate fertilizer supplied in interregional trade will originate in the United States and North Africa. Surplus phosphate supply capability in North America is forecast to increase from 4.6 million tons in 1980/81 to about 4.9 million in 1986/87. Suppliers' capabilities in Africa will increase from about 1 million tons to almost 2 million tons by 1986/87. In the Middle East, expanding supply capabilities will be offset by increased consumption, and this region's deficit will remain.

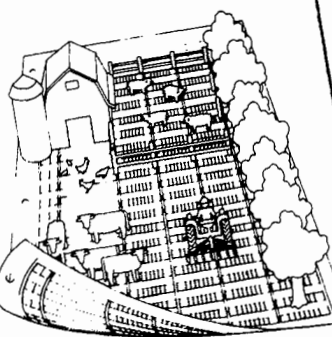
### Potash Trade To Grow

Interregional potash trade is expected to grow from about 4.2 million tons ( $K_2O$ ) in 1980/81 to about 5.8 million tons in 1986/87. North America, and Eastern Europe and the USSR will continue to provide the majority of world potash exports throughout the period. Oceania, Africa, and Asia will remain wholly dependent on imports for their potash needs. Even though new mines will open in Brazil, Latin America will produce only about 10 percent of its potash requirements in 1986/87. The Middle East will shift from a balanced potash trade position to a small net exporter in 1986/87, after Jordan's evaporation facility on the Dead Sea is completed.

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Appendix table 1--World nitrogen fertilizer supply capabilities, demand and balances <sup>1/</sup>

Region	Actual <sup>2/</sup>	Preliminary estimates	Forecasts				
			1980/81	1983/84	1984/85	1985/86	1986/87
<u>Million metric tons</u>							
North America							
Supply capability	13.54	12.97	13.04	13.33	13.59	13.73	13.72
Consumption	11.58	11.20	12.30	12.90	13.40	13.80	14.30
Surplus (-deficit)	1.96	1.27	0.74	0.43	0.19	-0.07	-0.58
Western Europe							
Supply capability	11.41	9.82	10.00	10.15	10.67	10.84	11.01
Consumption	9.84	9.95	10.40	10.90	11.10	11.30	11.50
Surplus (-deficit)	1.57	-0.13	-0.40	-0.75	-0.43	-0.46	-0.49
Oceania							
Supply capability	0.25	0.20	0.22	0.23	0.23	0.24	0.23
Consumption	0.24	0.27	0.28	0.29	0.30	0.31	0.32
Surplus (-deficit)	0.01	-0.07	-0.06	-0.06	-0.07	-0.07	-0.09
Other developed market economies							
Supply capability	1.69	1.44	1.43	1.45	1.41	1.42	1.37
Consumption	1.15	1.16	1.26	1.29	1.32	1.35	1.37
Surplus (-deficit)	0.54	0.28	0.17	0.16	0.09	0.07	0.00
Total developed market economies							
Supply capability	26.89	24.43	24.69	25.16	25.90	26.23	26.33
Consumption	22.84	23.08	24.24	25.38	26.12	26.76	27.49
Surplus (-deficit)	4.05	1.35	0.45	-0.22	-0.22	-0.53	-1.16
Africa							
Supply capability	.25	0.06	0.11	0.50	0.57	0.61	0.69
Consumption	.72	0.69	0.75	0.81	0.89	0.96	1.01
Surplus (-deficit)	-0.47	-0.63	-0.64	-0.31	-0.32	-0.35	-0.32
Latin America							
Supply capability	1.69	2.74	3.04	2.33	3.87	4.18	4.35
Consumption	2.84	2.85	3.07	3.21	3.35	3.50	3.64
Surplus (-deficit)	-1.15	-0.11	-0.03	0.12	0.52	0.68	0.71
Near East							
Supply capability	2.01	1.93	2.25	2.33	2.74	3.22	3.30
Consumption	1.81	1.81	1.96	2.14	2.32	2.47	2.60
Surplus (-deficit)	0.20	0.12	0.29	0.19	0.42	0.75	0.70
Far East							
Supply capability	4.70	5.30	5.99	6.38	7.06	8.06	9.01
Consumption	6.64	7.25	7.84	8.32	8.85	9.44	10.10
Surplus (-deficit)	-1.94	-1.95	-1.85	-1.94	-1.79	1.38	-1.09
Total developing market economies							
Supply capability	8.65	10.05	11.39	12.54	14.24	16.07	17.35
Consumption	11.98	12.61	13.64	14.50	15.43	16.39	17.37
Surplus (-deficit)	-3.33	-2.58	-2.25	-1.96	-1.19	-0.32	-0.02
Communist Asia							
Supply capability	10.84	10.76	11.06	11.27	11.48	11.68	11.89
Consumption	12.85	12.48	12.80	13.12	13.44	13.77	14.09
Surplus (-deficit)	-2.01	-1.72	-1.74	-1.85	-1.96	-2.09	-2.20
Eastern Europe and USSR							
Supply capability	16.30	17.39	18.87	20.53	21.79	22.13	22.19
Consumption	12.67	13.33	13.99	14.69	15.42	16.19	17.00
Surplus (-deficit)	3.63	4.06	4.88	5.84	6.37	5.94	5.19
Total centrally planned economies							
Supply capability	27.16	28.15	29.93	31.80	33.27	33.81	34.08
Consumption	25.52	25.81	26.79	27.81	28.86	29.96	31.09
Surplus (-deficit)	1.64	2.34	3.14	3.99	4.41	3.85	2.99
World total							
Supply capability	62.70	79.41	83.28	87.44	92.25	95.34	97.58
Available supply <sup>3/</sup>	59.57	62.61	66.01	69.50	73.41	76.11	77.76
Consumption	60.34	61.50	64.67	67.69	70.41	73.11	75.96
Surplus (-deficit) <sup>4/</sup>	1.85	1.11	1.34	1.81	3.00	3.00	1.81

<sup>1/</sup> Forecast supply capability refers to maximum total ammonia supply capability should demand be there, except that some production cuts announced by producers, particularly in developed market economies, have been taken into account. For new capacities in developing countries capacity utilization during the first year of operation is assumed to be 65 percent of final average capacity utilization for that country and 85 percent the second year and thereafter. For developed countries these same rates are 80 percent and 90 percent, respectively. Capacity utilization in ammonia unit is based on past experience on a country-by-country basis. Furthermore, deductions have been made for nitrogen used for nonfertilizer purposes (forecast country by country) and for nitrogen conversion losses in downstream fertilizer processing units. <sup>2/</sup> Actual refers to actual production and consumption as reported to to FAO. <sup>3/</sup> Available supply is world supply capability less a 5 percent allowance to account for normal stock changes, transportation and distribution losses, and the time lag between production and consumption. <sup>4/</sup> World surplus (deficit) does not equal the sum of regional balances because of adjustment described in footnote 3.

Source: Actual and preliminary estimates, FAO  
Forecast, FAO/UNIDO/World Bank Fertilizer Working Group, September 1982.

Appendix table 2--World phosphate capabilities, demand and balances 1/

Region	Actual 2/	Preliminary estimates	Forecasts				
	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
<u>Million metric tons</u>							
North America							
Supply capability	10.13	10.05	10.55	10.84	10.87	10.85	10.83
Consumption	5.54	4.90	5.27	5.49	5.86	5.91	5.94
Surplus (-deficit)	4.59	5.15	5.28	5.35	5.01	4.94	4.89
Western Europe							
Supply capability	5.68	5.98	5.96	5.98	5.93	5.90	5.86
Consumption	5.60	5.37	5.51	5.64	5.78	5.89	6.01
Surplus (-deficit)	0.08	0.61	0.45	0.34	0.15	0.01	-0.15
Oceania							
Supply capability	1.17	1.30	1.34	1.37	1.39	1.39	1.39
Consumption	1.20	1.12	1.21	1.30	1.39	1.42	1.43
Surplus (-deficit)	-0.03	0.18	0.13	0.07	0.00	0.03	-0.04
Other developed market economies							
Supply capability	1.17	1.77	1.82	1.82	1.82	1.81	1.78
Consumption	1.17	1.25	1.32	1.39	1.45	1.53	1.55
Surplus (-deficit)	0.00	0.52	0.50	0.43	0.37	0.28	0.23
Total developed market economies							
Supply capability	18.17	19.10	19.67	20.01	20.01	19.95	19.86
Consumption	13.52	12.64	13.31	13.82	14.48	14.75	14.93
Surplus (-deficit)	4.65	6.46	6.36	6.19	5.53	5.20	4.93
Africa							
Supply capability	0.72	1.63	1.84	2.02	2.17	2.40	2.71
Consumption	0.53	0.51	0.55	0.59	0.64	0.68	0.72
Surplus (-deficit)	0.19	1.12	1.29	1.43	1.53	1.72	1.99
Latin America							
Supply capability	1.43	1.44	1.57	1.75	1.89	1.94	1.96
Consumption	2.77	2.52	2.76	2.99	3.23	3.49	3.75
Surplus (-deficit)	-1.29	-1.08	-1.19	-1.24	-1.34	-1.55	-1.79
Near East							
Supply capability	0.58	0.68	0.86	1.04	1.23	1.38	1.43
Consumption	1.04	1.06	1.17	1.28	1.38	1.50	1.60
Surplus (-deficit)	0.46	-0.38	-0.31	-0.24	-0.15	-0.12	-0.17
Far East							
Supply capability	1.72	1.40	1.43	1.46	1.50	1.57	1.73
Consumption	2.20	2.55	2.79	3.00	3.22	3.49	3.73
Surplus (-deficit)	-0.48	-1.15	-1.36	-1.54	-1.72	-1.92	-2.00
Total developing market economies							
Supply capability	4.49	5.16	5.70	6.27	6.78	7.29	7.82
Consumption	6.54	6.64	7.27	7.86	8.47	9.16	9.80
Surplus (-deficit)	-1.55	-1.48	-1.57	-1.59	-1.69	-1.87	-1.98
Communist Asia							
Supply capability	2.54	2.75	2.85	2.96	3.06	3.17	3.28
Consumption	2.93	3.26	3.36	3.47	3.58	3.69	3.80
Surplus (-deficit)	-0.39	-0.51	-0.51	-0.51	-0.52	-0.52	-0.52
Eastern Europe and USSR							
Supply capability	8.74	8.02	8.54	9.04	9.45	9.83	10.14
Consumption	9.50	9.02	9.54	10.04	10.45	10.83	11.14
Surplus (-deficit)	-0.76	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00
Total centrally planned economies							
Supply capability	11.29	10.77	11.39	12.00	12.51	13.00	13.42
Consumption	11.43	12.28	12.90	13.51	14.03	14.52	14.94
Surplus (-deficit)	-0.14	-1.51	-1.51	-1.51	-1.52	-1.52	-1.52
World total							
Supply capability	34.44	36.86	38.69	40.30	41.37	42.35	43.25
Available supply 3/	32.17	35.03	36.76	38.28	39.30	40.24	41.10
Consumption	31.49	31.56	33.48	35.19	36.98	38.43	39.68
Surplus (-deficit) 4/	2.95	3.47	3.28	3.09	2.32	1.81	1.42

1/ Forecast supply capability refers to maximum capability should demand be there. It is made up of wet-process phosphoric acid production (100%) and other P<sub>2</sub>O<sub>5</sub> production consisting of ground rock phosphate (100 percent), single superphosphate (100 percent), basic slag (100 percent), and the phosphate rock contribution into the manufacturing of concentrated superphosphate (30 percent) and basic nitrophosphates (60-100 percent), depending on region. For existing plants, capacity utilization is based on past experience on a country-by-country basis. For new plants capacity utilization is assumed at 40, 80, and 90 percent in developed countries and at 35, 70, and 80 percent in developing countries for the first year, second year, and thereafter, respectively. Nonfertilizer uses have been forecast on a country-by-country basis and developed to give the acid available for fertilizers. Losses in the production process are estimated at 6 percent for all regions. 2/ Actual refers to actual production and consumption as reported to FAO. 3/ Available supply is 95 percent of world capabilities, reflecting past experience to account for normal stock changes, transportation and distribution losses, and the time lag between production and consumption. In the past 10 years, this ratio has varied between 94 percent and 98 percent. 4/ World surplus (deficit) does not equal the sum of regional balances because of adjustments described in footnote 3.

Source: Actual and preliminary estimates, FAO  
Forecast, FAO/UNIDO/World Bank Fertilizer Working Group, September 1982.

Appendix table 3--World potash fertilizer supply capabilities, demand and balances <sup>1/</sup>

Region	Actual <sup>2/</sup>	Preliminary estimates	Forecasts				
	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
<u>Million metric tons</u>							
North America							
Supply capability	9.38	7.64	9.29	9.55	10.27	10.12	10.83
Consumption	6.04	5.93	6.15	6.30	6.46	6.61	6.77
Surplus (-deficit)	3.34	1.71	3.14	3.25	3.81	3.51	4.06
Western Europe							
Supply capability	5.73	4.81	5.45	5.40	5.40	5.35	5.32
Consumption	5.31	5.28	5.46	5.59	5.73	5.85	5.98
Surplus (-deficit)	0.42	-0.47	-0.01	-0.19	-0.33	-0.50	-0.66
Oceania							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.22	0.24	0.25	0.26	0.26	0.27	0.28
Surplus (-deficit)	-0.22	-0.24	-0.25	-0.26	-0.26	-0.27	-0.28
Other developed market economies							
Supply capability	0.80	0.83	0.95	0.95	1.07	1.19	1.19
Consumption	0.68	0.81	0.83	0.84	0.86	0.87	0.88
Surplus (-deficit)	0.12	0.02	0.12	0.11	0.21	0.32	0.31
Total developed market economies							
Supply capability	15.90	13.28	15.69	15.90	16.74	16.66	17.34
Consumption	12.35	12.26	12.69	12.99	13.31	13.60	13.91
Surplus (-deficit)	3.65	1.02	3.00	2.91	3.43	3.06	3.43
Africa							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	0.24	0.26	0.28	0.30	0.32	0.34	0.36
Surplus (-deficit)	-0.24	-0.26	-0.28	-0.30	-0.32	-0.34	-0.36
Latin America							
Supply capability	0.03	0.02	0.02	0.08	0.15	0.20	0.24
Consumption	1.87	1.26	1.78	1.88	1.98	2.08	2.19
Surplus (-deficit)	1.84	-1.24	-1.76	-1.80	-1.83	-1.88	-1.95
Near East							
Supply capability	0.00	0.00	0.00	0.11	0.28	0.37	0.46
Consumption	0.07	0.06	0.06	0.07	0.07	0.07	0.08
Surplus (-deficit)	-0.07	-0.06	0.06	0.04	0.21	0.30	0.38
Far East							
Supply capability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumption	1.26	1.28	1.37	1.45	1.53	1.60	1.68
Surplus (-deficit)	-1.26	-1.28	-1.37	-1.45	-1.53	-1.60	-1.68
Total developing market economies							
Supply capability	0.02	0.02	0.02	0.19	0.43	0.57	0.70
Consumption	3.46	2.86	3.49	3.70	3.90	4.09	4.31
Surplus (-deficit)	-3.44	-2.84	-3.47	-3.51	-3.47	-3.52	-3.61
Communist Asia							
Supply capability	0.03	0.02	0.02	0.02	0.02	0.02	0.02
Consumption	0.58	0.70	0.73	0.77	0.81	0.85	0.89
Surplus (-deficit)	-0.55	-0.68	-0.71	-0.75	-0.79	-0.83	-0.87
Eastern Europe and USSR							
Supply capability	11.47	10.61	11.64	12.48	13.45	14.19	14.53
Consumption	7.98	8.53	9.00	9.43	9.85	10.26	10.67
Surplus (-deficit)	3.49	2.08	2.64	3.05	3.60	3.93	3.86
Total centrally planned economies							
Supply capability	11.51	10.63	11.66	12.50	13.47	14.21	14.55
Consumption	8.56	9.23	9.73	10.20	10.66	11.11	11.56
Surplus (-deficit)	2.95	1.40	1.93	2.30	2.81	3.10	2.99
World total							
Supply capability	27.43	25.81	29.53	30.87	33.11	33.99	35.22
Available supply <sup>3/</sup>	26.06	23.93	27.37	28.59	30.64	31.44	32.59
Consumption	24.26	24.35	25.91	26.69	27.87	28.80	29.78
Surplus (-deficit) <sup>4/</sup>	3.17	-0.42	1.46	1.70	2.77	2.64	2.81

<sup>1/</sup> Forecast supply capability refers to maximum total potash supply capability should demand be there. For existing plants, capacity utilization is based on past experience. For new mines, capacity utilization is assumed at 30, 75, and 90 percent for known developed ore bodies and 20, 60, 75, and 90 percent for unknown ore bodies for the first, second, third years, and the fourth year and thereafter, respectively. <sup>2/</sup> Actual refers to actual product and consumption as reported to FAO. <sup>3/</sup> Available supply is world supply capability less 3.5 percent technical potash, less 5 percent to account for normal stock increases, transportation and distribution losses, and the time lag between production and consumption. <sup>4/</sup> World surplus (deficit) does not equal the sum of regional balances because of adjustments described in footnote 3.

Source: Actual and preliminary estimate, FAO  
Forecast, FAO/UNIDO/World Bank Fertilizer Working Group, September 1982.

Appendix table 4--Use of nitrogen as fertilizer, by States, 1976-81 1/

State and region	1977	1978	1979	1980	1981	1982
1,000 tons of N						
Maine	14.3	13.3	13.6	12.6	13.6	12.2
New Hampshire	2.7	3.1	3.4	3.2	3.1	3.4
Vermont	7.4	6.2	7.3	7.5	7.9	7.9
Massachusetts	9.0	11.5	10.3	9.1	9.4	7.7
Rhode Island	2.3	1.5	1.7	1.8	1.6	1.5
Connecticut	8.9	7.8	7.6	7.7	7.8	6.4
New York	86.8	84.4	107.8	108.7	92.9	90.7
New Jersey	24.6	23.2	25.0	25.0	26.7	26.8
Pennsylvania	96.8	98.2	80.9	86.1	92.5	95.3
Delaware	19.9	16.5	17.7	22.1	24.9	17.7
Maryland	70.2	58.5	66.5	65.6	67.2	56.9
Dist. of Columbia	1.1	.9	1.9	1.9	1.4	1.4
Northeast	344.0	324.7	343.7	351.3	349.0	327.9
Michigan	217.4	216.2	239.8	236.5	260.1	258.2
Wisconsin	203.9	214.0	216.4	228.4	259.8	251.2
Minnesota	521.0	491.7	612.4	617.7	663.2	576.4
Lake States	942.3	921.9	1,068.6	1,082.6	1,183.1	1,085.8
Ohio	363.5	347.2	329.3	424.7	451.8	450.9
Indiana	495.7	504.2	492.6	511.2	493.7	531.5
Illinois	977.6	792.5	906.1	1,034.1	999.6	1,038.7
Iowa	852.4	921.1	1,003.6	1,069.0	1,164.8	1,048.8
Missouri	406.3	308.6	360.1	410.9	401.9	324.7
Corn Belt	3,095.5	2,873.6	3,154.7	3,449.9	3,511.9	3,394.7
North Dakota	229.1	253.1	294.9	336.3	315.9	300.0
South Dakota	95.8	104.6	116.1	133.1	160.7	151.9
Nebraska	748.9	733.8	752.3	826.3	785.5	679.6
Kansas	636.8	551.5	603.9	638.5	628.1	588.4
Northern Plains	1,710.6	1,643.1	1,767.2	1,934.2	1,891.5	1,719.9
Virginia	114.4	98.7	98.4	93.9	102.0	100.4
West Virginia	10.7	9.0	7.7	15.5	18.2	12.9
North Carolina	261.8	222.3	235.2	236.9	263.9	235.5
Kentucky	182.8	167.1	157.3	176.8	207.7	202.0
Tennessee	131.0	119.6	109.4	118.8	149.6	127.8
Appalachian	700.6	616.7	608.0	641.9	736.7	678.6
South Carolina	116.0	97.4	90.1	91.5	109.5	90.1
Georgia	349.8	286.8	280.6	272.6	300.7	249.5
Florida	248.7	231.9	258.8	249.5	248.3	235.2
Alabama	188.3	161.7	151.9	143.7	162.2	148.8
Southeast	902.7	777.8	781.4	757.3	820.4	723.6
Mississippi	190.5	168.5	150.8	157.3	197.2	176.9
Arkansas	173.0	135.0	141.2	172.0	226.6	218.2
Louisiana	124.3	116.0	108.2	133.9	141.5	134.8
Delta States	487.8	419.5	400.2	463.2	565.3	529.9
Oklahoma	256.6	243.5	303.6	308.2	281.9	272.8
Texas	748.6	685.4	732.8	737.2	838.4	686.5
Southern Plains	1,005.2	928.9	1,036.4	1,045.4	1,120.3	959.3
Montana	64.0	54.0	76.4	64.9	86.4	115.1
Idaho	139.0	161.0	174.0	164.8	175.4	181.1
Wyoming	23.3	23.9	26.9	24.8	39.3	25.2
Colorado	118.1	136.8	126.0	168.8	153.5	172.1
New Mexico	32.3	32.3	28.4	31.1	29.2	29.5
Arizona	110.0	93.8	93.0	115.8	121.6	105.9
Utah	23.4	27.7	29.2	32.8	38.8	38.0
Nevada	4.8	5.4	5.8	4.3	4.2	4.1
Mountain	514.9	534.9	559.7	607.3	648.5	671.0
Washington	175.1	211.0	238.1	234.7	260.2	236.4
Oregon	127.2	122.7	138.4	147.0	150.3	146.8
California	596.1	544.7	575.1	649.9	654.8	567.5
Pacific	898.4	878.4	951.6	1,031.6	1,063.7	950.7
48 States & D.C.	10,602.1	9,919.5	10,671.5	11,887.2	11,887.2	11,041.4
Alaska	1.8	1.0	1.1	1.8	2.2	4.9
Hawaii	25.7	28.8	26.2	23.1	18.9	22.1
United States	10,629.6	9,949.3	10,698.8	11,389.6	11,908.0	11,068.1

1/ Totals may not add because of rounding.

Source: Consumption of Commercial Fertilizers in the United States, SPCK 7 (11-81) and earlier issues, Crop Reporting Board, SRS, USDA, November 1982.

Appendix table 5--Use of phosphorus as fertilizer, by State, 1977-82 <sup>1/</sup>

State and region	1977	1978	1979	1980	1981	1982
1,000 tons available P <sub>2</sub> O <sub>5</sub>						
Maine	17.0	15.0	14.7	13.3	12.7	12.4
New Hampshire	2.2	2.6	2.5	2.7	2.5	2.5
Vermont	8.6	5.5	6.8	6.0	6.7	6.5
Massachusetts	5.9	7.6	6.2	5.4	7.5	4.3
Rhode Island	1.6	1.3	1.6	1.2	1.3	1.1
Connecticut	5.8	5.3	5.3	5.5	4.3	3.7
New York	78.5	76.8	90.1	80.2	81.3	75.9
New Jersey	21.5	17.5	18.8	18.6	17.9	18.1
Pennsylvania	94.7	91.7	76.1	71.2	78.9	79.7
Delaware	14.3	12.8	13.6	14.0	14.3	9.5
Maryland	59.7	50.3	54.6	47.5	56.4	36.5
Dist. of Columbia	.5	.5	.8	.6	.4	.4
Northeast	310.2	286.9	291.1	266.2	283.9	250.6
Michigan	161.7	168.5	173.4	163.4	176.5	178.0
Wisconsin	165.9	170.3	171.5	156.4	168.5	157.6
Minnesota	295.6	274.7	331.8	302.2	324.3	285.0
Lake States	623.2	613.4	676.7	622.0	669.3	620.6
Ohio	287.6	268.7	308.8	307.6	303.3	251.9
Indiana	339.8	324.0	336.2	324.4	325.1	290.7
Illinois	587.1	454.9	537.0	543.6	536.3	532.7
Iowa	417.8	423.9	496.7	481.3	480.8	382.5
Missouri	211.4	167.8	209.6	218.1	190.3	148.3
Corn Belt	1,843.7	1,639.3	1,888.3	1,875.0	1,835.8	1,606.2
North Dakota	140.7	120.3	132.6	116.4	119.4	114.0
South Dakota	55.9	60.8	60.8	58.0	64.3	58.3
Nebraska	186.0	160.4	176.1	172.6	191.0	162.7
Kansas	198.8	158.4	194.5	205.5	190.6	170.5
Northern Plains	581.3	500.0	564.0	552.5	565.3	505.5
Virginia	78.5	72.5	74.2	64.0	69.0	69.4
West Virginia	10.8	7.9	8.5	9.3	8.9	9.7
North Carolina	163.9	150.0	158.6	142.1	143.0	128.1
Kentucky	150.5	133.0	140.8	135.1	144.4	138.5
Tennessee	122.4	111.7	120.6	108.9	128.5	91.9
Appalachian	526.1	475.1	502.7	459.4	493.8	437.7
South Carolina	77.8	66.8	64.9	60.5	58.7	46.3
Georgia	180.3	153.3	160.5	151.0	142.8	109.1
Florida	112.8	111.0	127.5	111.4	107.3	98.8
Alabama	114.5	109.0	112.7	102.9	99.7	87.8
Southeast	485.4	440.1	465.6	425.8	408.5	342.0
Mississippi	90.2	77.6	73.9	73.5	81.1	68.1
Arkansas	78.4	66.1	69.1	65.8	63.1	55.5
Louisiana	68.4	71.3	66.4	94.9	69.7	53.8
Delta States	237.1	215.0	209.4	234.2	213.9	177.4
Oklahoma	113.2	85.8	112.7	113.7	107.8	95.1
Texas	277.7	250.8	289.6	274.7	281.1	233.9
Southern Plains	390.9	336.6	402.3	388.4	388.9	329.1
Montana	74.3	59.8	79.0	57.5	70.1	77.6
Idaho	61.1	64.7	56.3	57.5	53.2	62.5
Wyoming	10.4	11.7	7.4	6.2	11.8	14.4
Colorado	43.8	46.8	32.1	48.8	44.6	44.9
New Mexico	17.6	16.8	21.4	11.4	13.4	12.2
Arizona	41.5	29.6	35.3	37.0	32.8	33.8
Utah	21.0	14.8	13.1	10.7	15.9	14.8
Nevada	2.1	1.8	2.1	2.4	2.2	1.9
Mountain	271.7	246.0	246.7	231.5	244.0	262.1
Washington	65.3	60.7	67.4	76.1	66.2	58.4
Oregon	50.3	42.1	49.3	53.1	53.2	48.0
California	213.2	203.5	208.6	220.4	191.4	164.9
Pacific	328.8	306.3	325.3	349.6	310.8	271.3
48 States & D.C.	5,598.5	5,058.7	5,572.1	5,404.6	5,414.2	4,802.5
Alaska	1.3	.9	.7	1.4	1.3	.9
Hawaii	23.3	30.0	25.8	19.3	13.6	11.0
United States	5,623.1	5,089.6	5,598.6	5,425.3	5,428.7	4,813.8

<sup>1/</sup> Totals may not add because of rounding.

Source: Consumption of Commercial Fertilizers in the United States, SPGR 7 (11-81) and earlier issues, Crop Reporting Board. ERS, USDA, November 1982.

Appendix table 6--Use of potash as fertilizer, by State, 1977-82 1/

State and region	1977	1978	1979	1980	1981	1982
1,000 tons of K <sub>2</sub> O						
Maine	16.9	15.7	15.1	13.6	13.0	12.7
New Hampshire	2.9	3.3	3.6	3.4	3.4	3.4
Vermont	7.3	6.5	7.7	7.6	8.5	10.1
Massachusetts	6.6	8.6	7.5	6.4	6.9	5.8
Rhode Island	1.6	1.1	1.3	1.1	1.0	1.2
Connecticut	4.8	5.1	5.1	5.3	5.3	4.5
New York	81.4	83.9	94.7	84.2	93.1	87.7
New Jersey	23.2	21.0	22.0	22.8	21.1	21.8
Pennsylvania	88.6	90.6	74.7	75.0	70.5	66.8
Delaware	23.1	19.2	20.6	24.7	27.6	19.7
Maryland	73.5	61.1	67.4	61.3	71.5	47.7
Dist. of Columbia	.4	.4	.7	.7	.5	.5
Northeast	330.3	316.5	320.4	306.1	322.4	281.9
Michigan	219.2	233.9	249.8	243.5	264.9	243.9
Wisconsin	351.9	381.0	344.0	342.5	372.4	355.5
Minnesota	360.8	358.0	439.3	406.8	463.4	373.1
Lake States	931.9	972.9	1,033.1	992.8	1,100.7	972.6
Ohio	351.3	350.9	415.9	434.9	431.8	389.3
Indiana	522.0	468.4	545.1	549.8	519.1	451.7
Illinois	764.3	662.3	785.3	847.0	823.6	775.8
Iowa	478.1	458.8	641.9	627.3	637.4	585.0
Missouri	268.3	218.6	286.0	306.8	293.4	237.2
Corn Belt	2,384.1	2,159.0	2,674.2	2,765.8	2,705.3	2,439.0
North Dakota	18.7	19.3	24.0	20.1	22.6	21.9
South Dakota	15.0	15.4	17.2	16.5	20.9	15.7
Nebraska	69.7	63.8	68.8	67.7	71.4	54.6
Kansas	54.7	43.4	50.1	56.2	47.2	44.0
Northern Plains	158.2	141.9	160.1	160.5	162.1	136.2
Virginia	97.5	90.1	95.5	93.3	93.7	95.6
West Virginia	8.8	8.8	7.7	7.5	9.0	9.8
North Carolina	233.1	216.5	226.0	229.3	234.2	212.6
Kentucky	169.7	158.0	166.9	165.2	174.3	171.1
Tennessee	130.3	134.2	135.5	129.5	136.5	113.9
Appalachian	639.4	607.6	631.6	624.8	647.8	603.0
South Carolina	133.0	116.0	119.7	121.2	118.7	93.9
Georgia	273.9	235.9	248.5	234.5	227.9	180.8
Florida	249.7	256.4	288.5	277.4	272.3	254.4
Alabama	132.3	127.5	137.7	123.7	117.1	104.1
Southeast	788.8	735.8	794.4	756.8	736.0	633.2
Mississippi	95.9	92.0	94.9	86.2	99.4	86.6
Arkansas	96.2	86.1	85.4	93.6	86.2	75.0
Louisiana	75.4	79.4	80.7	111.1	89.2	67.3
Delta States	267.4	257.6	261.0	290.9	274.8	228.9
Oklahoma	34.3	32.1	40.6	39.9	37.6	28.9
Texas	98.7	95.2	116.3	103.4	118.4	101.1
Southern Plains	132.9	127.4	156.9	143.3	156.0	130.0
Montana	8.6	5.3	10.3	8.8	10.8	12.4
Idaho	12.8	15.1	14.9	8.4	7.3	7.5
Wyoming	1.7	1.5	.7	.7	.9	.5
Colorado	11.0	9.4	10.9	11.0	11.3	11.0
New Mexico	1.6	2.4	2.7	2.8	2.8	2.7
Arizona	1.2	1.8	3.6	.5	.5	.5
Utah	.8	2.6	.9	.6	.3	.3
Nevada	.2	.2	.2	.3	.3	.4
Mountain	37.9	38.3	44.2	33.1	34.2	35.4
Washington	30.2	32.9	33.1	27.4	40.3	37.5
Oregon	25.6	26.8	24.6	26.3	23.2	23.1
California	69.1	73.6	69.4	8.25	81.6	61.9
Pacific	124.9	133.3	127.1	136.2	145.1	122.5
48 States & D.C.	5,795.7	5,490.1	6,203.0	6,210.3	6,284.4	5,582.7
Alaska	1.2	.6	.5	1.0	.8	.6
Hawaii	24.0	23.3	28.2	20.9	22.0	24.1
United States	5,820.9	5,514.0	6,231.7	6,232.2	6,307.2	5,607.4

1/ Totals may not add because of rounding.

Source: Consumption of Commercial Fertilizers in the United States, SPCR 7 (11-82) and earlier issues, Crop Reporting Board, SRS, USDA, November 1982.

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