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OUTLOOK FOR PRODUCTION INPUTS

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The outlook for farm inputs consumption and expenditure in 1993 will be influenced by energy prices, an expected decrease in row crop acreage, and an anticipated increase in solid seeded crop acreage next year. Farmers are expected to spend between $144 and $148 billion in 1993 for agricultural inputs, representing a 1 to 2 percent increase from the estimated 1992 level. Planted acreage of the major crops in 1993 may be slightly less than 1992 levels which would likely reduce the use of most crop inputs. However, aggregate input expenses likely will remain stable or increase slightly due to higher manufactured input costs.

Planted Acreage

Input use on crops is highly dependent on the mix and level of crop acres planted. Per acre seeding rates, application rates for fertilizer and pesticides, and tillage practices tend to change slowly from year-to-year, leaving acres planted as the major short-run determinant of aggregate consumption.

Planted acreage of the principal row and solid seeded crops peaked in 1981, fell dramatically in the PIK-year of 1983, bounced back in 1984 and declined through 1988[1]. During 1989 to 1992, planted acreage was 3-5 percent above 1988 levels. Much of the planted acreage variation in the 1980's was due to input intensive row crops. The less intensively farmed small grains crop acreage, which is dominated by winter wheat, declined between 1982 and 1988 but increased 6 million acres between 1988 and 1990. Planted acreage of solid seeded crops declined again

[1]Principal row crops include planted area of corn, sorghum, soybeans, flaxseed, peanuts, sunflowers, cotton, dry edible beans, potatoes, sweet potatoes, and sugarbeets; and harvested area of tobacco and sugarcane. Principal solid seeded crops include planted area of oats, barley, durum and other spring wheat, rice, winter wheat, and rye. All hay area is for harvested acreage only.

in 1991-92. Planted acreage of the principal crops in 1992 was about 328 million acres and is expected to be down by about 2 million in 1993.

The mix of crops in 1993 is likely to shift due to different Acreage Reduction Program (ARP) levels and increased flexibility of farm programs. There will likely be a decrease in row crop acreage, especially corn, due to the corn ARP increase from 5 percent in 1992 to 10 percent in 1993. An increase in solid seeded crop acreage will probably occur because of the decrease in wheat ARP acres from 5 percent in 1992 to 0 percent in 1993. Oats and barley also have zero ARP's for 1993.

Seed Consumption

In 1992, seed consumption of the eight[2] major field crops was close to 6.0 million tons, down 17 percent from the record year of 1981 when 7.2 million tons were planted. Seed use on corn, sorghum, wheat, and rice were up in 1992 while barley and cotton seed use were lower than 1991. Soybean seed use remained about the same. For 1993, seed use is expected to increase 1 to 2 percent since the increase in seed demand for wheat, soybeans, oats, and barley will more than offset the expected decline in seed demand for planted acreage of corn, sorghum, and cotton.

Higher corn, grain sorghum, small grains, and cotton seed prices in 1992 were offset by generally lower seed potato, soybeans, and most of the forage seed prices. As a result, USDA's prices paid index for seed was 1 percent lower than the previous year. Adequate seed supplies, a modest increase in seed demand, and small commodity price movements should keep the seed price index increase to less than 1 percent in 1993. Seed prices, especially for non-hybrid crops, tends to follow commercial crop prices and with the exception of wheat and oats, commodity prices in 1993 are forecast to fall below 1992 levels.

Fertilizer Consumption

Estimated fertilizer nutrient consumption of about 20.9 million tons for the 1992 fertilizer year is 3 percent more than the 1991 consumption of 20.3 million tons. Fertilizer use in 1993 should be near 20.2 million tons, if expected reductions in row crop acreage, especially corn, is realized.

The 1992 application rate survey for wheat indicates that the share of acres treated with N and P were more than in 1991, but

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[2]The eight major field crops for seed consumption include barley, corn, cotton, grain sorghum, oats, rice, soybeans, and wheat.

less for k. Application rates were slightly higher for nitrogen, but less for phosphate and potash. In the case of corn, the major consumer of fertilizer nutrients, per acre application rates for nitrogen, phosphate and potash were less than 1991 levels. Percent of acres treated were the same or less than 1991.

U.S. fertilizer prices declined sharply in 1992. Reduced world demand, as a direct result of the economic reforms in Eastern Europe and the former USSR, and burdensome U.S. stocks due to less than anticipated increases in U.S. planted acreage put downward pressure on prices. Despite modest decreases in demand projected for 1993, prices will likely be up slightly in 1993, due to the recent surge in natural gas prices. The sharp rise in anhydrous ammonia prices during the latter half of this year signals a return to the more nominal price levels experienced in 1991.

Pesticide Use

Estimates for pesticide use on the 10 major field crops also closely follow planted acreage with herbicides accounting for an estimated 84 percent of all active ingredients, insecticides about 14 percent, and fungicides and other compounds the remainder.[3] The herbicide market for the major crops of corn, cotton and soybeans is very mature with over 90 percent of the corn, soybean, and cotton acreage treated with herbicides, since the late 1970's. In recent years, over 95 percent of the corn and soybeans acres were treated with herbicides.

Application of pesticides on the major field crops is estimated at around 450-500 million pounds of active ingredients (a.i.) with year-to-year variations due to shifts in planted acreage and pest infestations. Since corn, soybeans, wheat and cotton account for the largest portion of pesticide use, changes in these crop acres will significantly affect aggregate pesticide use. With 1993 wheat and soybean acreage expected up and corn and cotton acreage down, pesticide consumption is expected to decrease 3 percent from 1992 levels. As new products, which require very small amounts of a.i. per acre, are more widely adopted, aggregate pesticide poundage may actually decline even though acres treated remain stable or even increase.

Pesticides prices, as measured by USDA's prices paid index for agricultural chemicals, trended downward between 1984 and 1987 but the trend has reversed with the index increasing 25 percent between 1988 and 1992. Despite fewer planted acres in 1993, pesticide prices will likely increase 4 to 6 percent. Petroleum

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[3]The 10 major field crops are wheat, barley, oats, rice, corn, cotton, grain sorghum, peanuts, soybeans, and tobacco.

feedstock price increases, pesticide manufacturers increased expenditures for research and development of new products, and additional costs for reregistering older products are reflected in pesticide prices paid by farmers.

Capital Purchases

Repairs and depreciation on tractors, farm machinery and other capital equipment and buildings on farms accounted for around 18 percent of all farm production expenses the last five years. In 1991, capital purchases and repairs totaled $25 billion for the farm sector.

Tractor purchases by farmers had been in a seven year decline through 1986. Since that time tractors made a steady recovery through 1990, but declined in 1991 and are forecast to be down again in 1992. Unit sales, at 119,000 in 1980, declined to 47,000 in 1986. Sales rose to 66,000 in 1990, and are forecast at 53,000 units in 1992. Purchases decreased proportionately more for larger tractors and combines. Combine purchases for the first 9 months of 1992 were 33 percent below those of the corresponding months of 1991.

The downturn in 1992 occurred despite lower interest rates, higher farm assets, and lower debt/asset ratios, factors normally associated with increased capital purchases. However, capital purchases for both 1991 and 1992 were below 1990 levels. The economic slowdown and its effect on farmer expectations about future commodity prices and farm incomes likely has been a major factor in decreased farm machinery investment since 1990. Also, farmers recall the financial distress experienced in the farm sector during the 1980s caused by increasing debt and decreasing assets. Many farmers are reluctant to incur higher debt to avoid a return to a farm financial crisis like that of the 1980s. Lenders have also tightened credit requirements.

Increased conservation practices are also affecting purchases of farm machinery and fuel. To comply with 1995 USDA requirements for farm plans to conserve highly erodible soil, farmers are adopting various conservation tillage measures, such as no-till, mulch-till, and ridge-till, all of which require fewer tillage operations, and consequently, less hours of use for tractors and machinery. Decreased hours of use translate into fewer purchases of equipment and less fuel consumption. Furthermore, there is not likely to be a trend back to moldboard plows and conventional tillage.

Accompanying the trend in reduced tillage is a trend toward larger, more durable tractors and machinery. Larger equipment will cover the same acreage in less time. More durable equipment lasts longer. These factors tend to increase the optimal

replacement age of tractors and equipment, or in economic jargon, lengthen the real depreciation schedule.

However, it is anticipated that in 1993 demand factors favoring increased capital equipment purchases will outweigh those depressing demand. For 1993, a slight increase in tractor purchases is anticipated. Several factors should work together to bring about the increase. Farm income in 1992 is forecast up from 1991. Machinery purchases tend to lag farm income, a positive factor for 1993. The value of farm assets will probably continue to increase in 1993 and the debt asset ratio should hold steady at about 14-15. The capital stock of farm machinery on farms is aging and increased replacement will likely occur as farmers find it more efficient to buy new rather than repairing old machinery. Interest rates for farm equipment loans are the lowest they have been since 1962, another positive factor toward increased purchases. And even though farmers are adopting more reduced tillage practices, many of these practices require special equipment, such as heavier drills and special ridge-till cultivators, which implies a continued trend away form moldboard plows to the newer reduced tillage equipment. Combine purchases are expected to level off at about the forecast 1992 figure of 7,700 units, ending three years of successive declines in purchases.

Tractor, truck and machinery prices have risen nearly every year since 1980. From 1980 to 1992, prices of farm trucks and autos have more than doubled. Price increases will likely continue through 1993, probably in the range of 3 to 5 percent.

Table 1--Prices paid for trucks, tractors, and other farm machinery

Year	Trucks and autos	Tractors and self-propelled machinery	Other machinery
		1977 = 100	
1982	159	165	160
1983	170	174	171
1984	182	181	180
1985	193	178	183
1986	198	174	182
1987	208	174	185
1988	215	181	197
1989	223	193	208
1990	231	202	216
1991	244	211	226
1992 July	262	217	234

Source: National Agricultural Statistics Service, USDA.

Petroleum Products

Consumption of petroleum products by agricultural producers declined 21 percent from 1985 to 1989. From 1990 through 1992, consumption has been stable at about 4.8 billion gallons. Energy use for 1993 is forecast to decline about 50 million gallons from 1992, based on forecasts of fewer planted acres next year.

World crude oil prices heavily influence the prices farmers pay for refined petroleum products. Petroleum prices dropped almost continuously between 1982 and 1986. Petroleum prices and crude oil prices were relatively stable between 1986 and 1989, rose during the Middle-East crisis, and decreased in 1991 and 1992. The Department of Energy is forecasting 1993 imported crude oil price increases of 6.6 percent from 1992 levels, while the 1993 diesel fuel price is forecast to increase by about 5 percent. Since agriculture directly consumes only 3-4 percent of all energy used in the United States, changes in the farm sector's usage will have little impact on petroleum prices.

In addition to increased use of reduced tillage, other factors are affecting the decline in fuel use. The switch from gasoline to diesel engines, larger multi-function machines, and innovations in crop drying and irrigation have contributed to the long-run decline in fuel consumption.

Table 2--Fertilizer use on selected crops in the major producing States, 1992 (preliminary)

State	Acres 1/	Acres receiving			Application rate			State	Acres 1/	Acres receiving			Application rate		
		N	P205	K20	N	P205	K20			N	P205	K20	N	P205	K20
	Thousand	Percent			Pounds per acre				Thousand	Percent			Pounds per acre		
		Corn for grain								All wheat 2/					
IL	11,200	99	85	84	155	77	105	AR	900	100	36	36	101	44	58
IN	6,100	97	89	84	143	66	107	CO	2,300	63	15	6	39	16	10
IA	13,400	96	77	73	118	57	69	ID	800	91	51	7	93	35	28
MI	2,700	96	89	85	119	52	87	IL	1,100	98	86	71	86	73	85
MN	7,200	97	87	84	110	48	64	IN	450	98	83	81	88	62	67
MO	2,450	96	75	77	138	52	70	KS	10,900	87	50	8	58	33	32
NE	8,300	98	73	29	136	37	19	MN	2,800	96	90	66	86	34	39
D1 3/	2,706	95	56	25	94	41	19	MO	1,350	96	82	82	77	49	54
D2 4/	5,594	99	81	30	155	35	19	MT	4,900	68	62	13	32	24	16
OH	3,800	100	92	88	149	69	96	NE	1,950	77	38	7	47	29	13
SD	3,800	84	72	29	78	38	19	ND	11,400	83	73	15	55	28	14
WI	3,900	99	95	95	86	44	62	OH	1,140	100	94	91	89	63	65
10 State								OK	6,000	94	46	8	73	33	21
Total	62,850	97	82	72	127	57	79	OR	850	97	19	10	63	34	25
								SD	3,900	65	54	4	42	26	14
								TX	3,800	69	31	6	77	41	14
								WA	2,000	97	40	7	75	28	17
								14 State Total	56,540	83	56	18	63	34	39

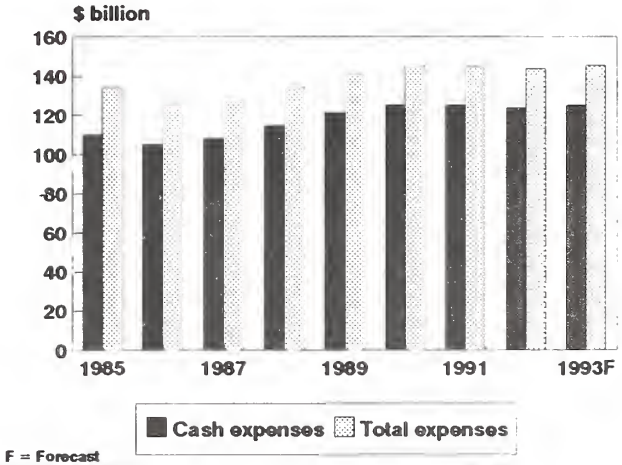
1/ Acres are harvested for winter wheat and planted for all other crops.
2/ Does not include winter wheat in MN, ND and SD; spring wheat in CO and WA; and durum wheat in MN, MT, and SD.
3/ Non-irrigated.
4/ Irrigated.

Table 3--Seeding rates, and seed cost per acre, 1992 (preliminary)

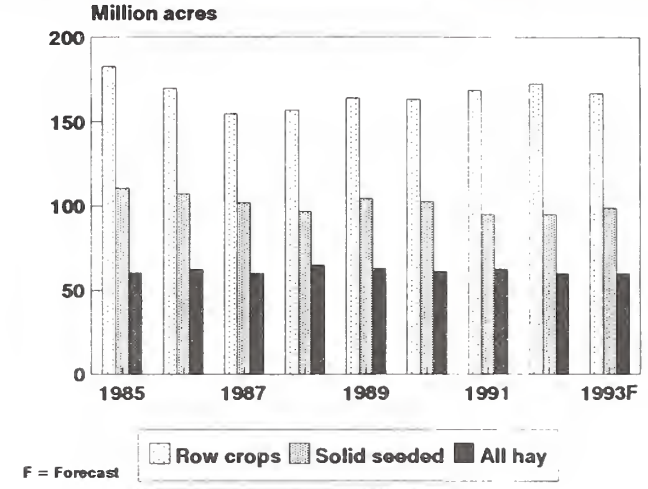
States	Acres Planted	Rate Per acre	Cost per acre	State	Acres Planted	Rate per acre	Cost per acre
	Corn for grain				Spring wheat		
	Thousand	Kernel	Dollars		Thousand	Pounds	Dollars
IL	11,200	25,628	21.51	MN	2,800	110	10.67
IN	6,100	25,041	19.71	MT	2,650	64	6.35
IA	13,400	25,790	21.86	ND	9,200	93	7.78
MI	2,700	24,802	20.06	SD	2,700	92	7.59
MN	7,200	27,175	23.76				
MO	2,450	22,567	19.52	4 State Total	17,350	91	8.39
NE	8,300	25,124	21.95				
D1 1/	2,706	19,275	16.39				
D2 2/	5,594	27,953	24.64				
OH	3,800	26,399	22.68		Durum wheat		
SD	3,800	20,019	17.56				
WI	3,900	26,194	20.40		Thousand	Pounds	Dollars
10 State Total	62,850	25,304	21.35	ND	2,200	96	7.56

1/ Non-irrigated.
2/ Irrigated.

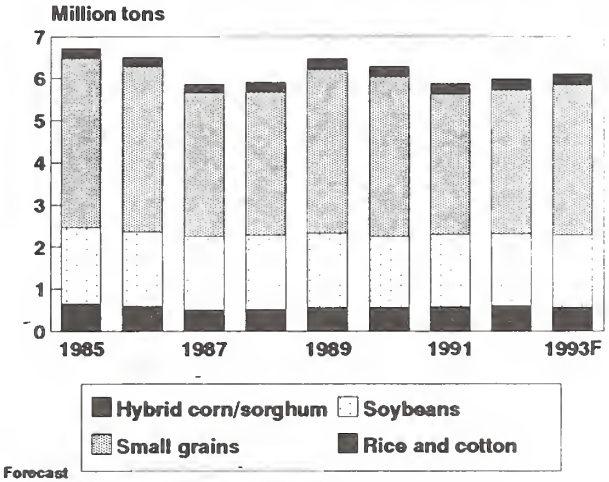
Farm Expenses



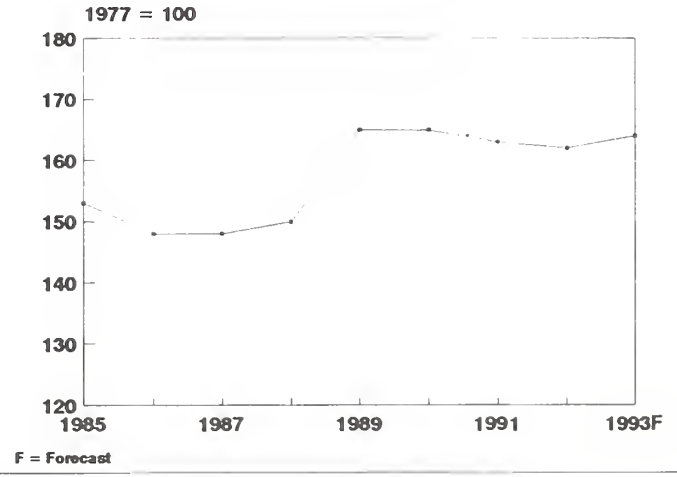
Area Planted to Principal Crops



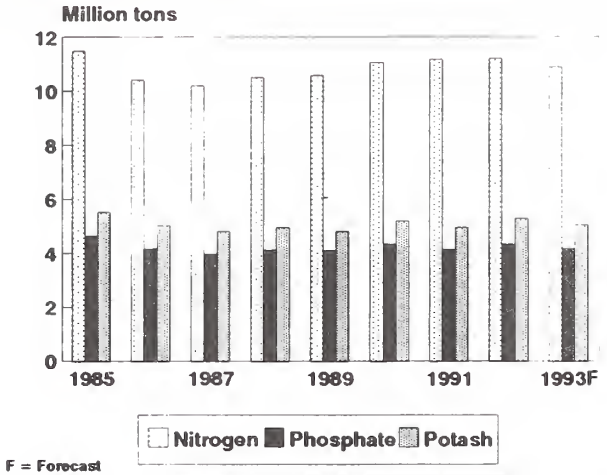
Seed Use for Major Crops



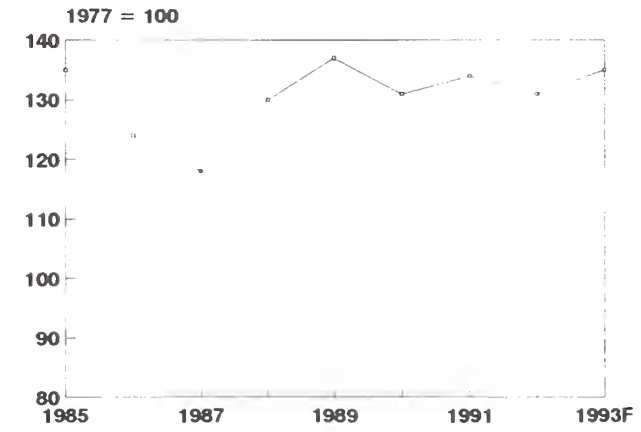
Seed Price Index



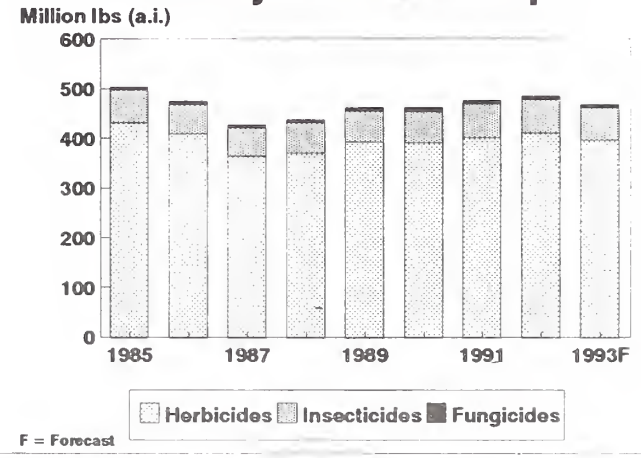
Fertilizer Nutrient Consumption



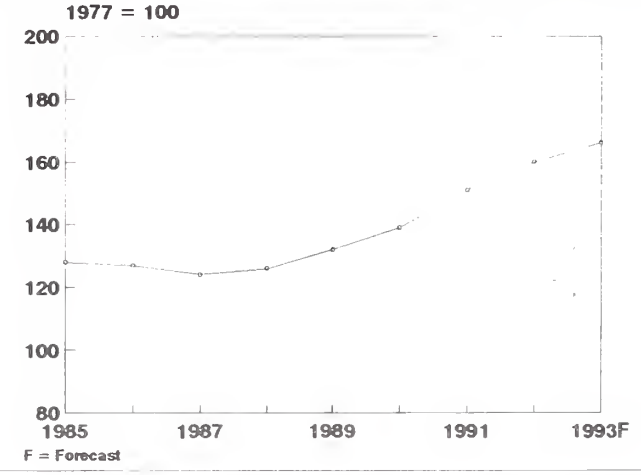
Fertilizer Price Index

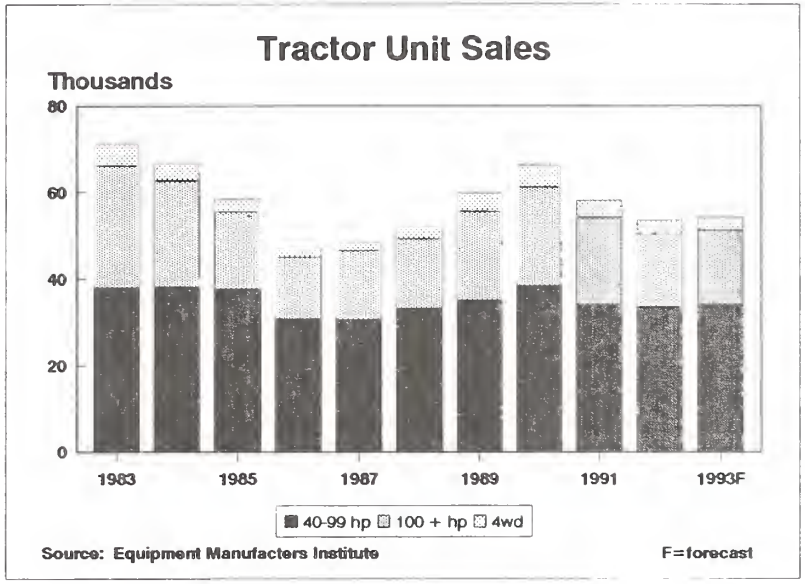


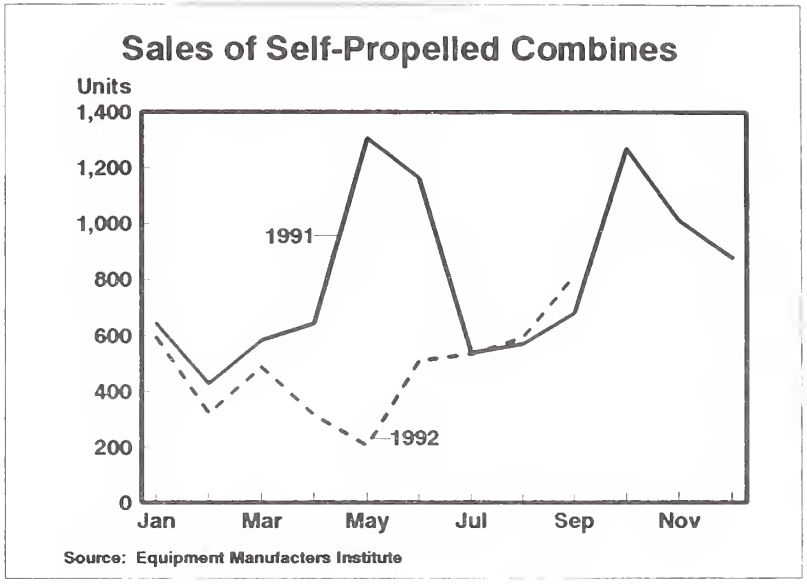
Estimated Pesticide Use on Major Field Crops

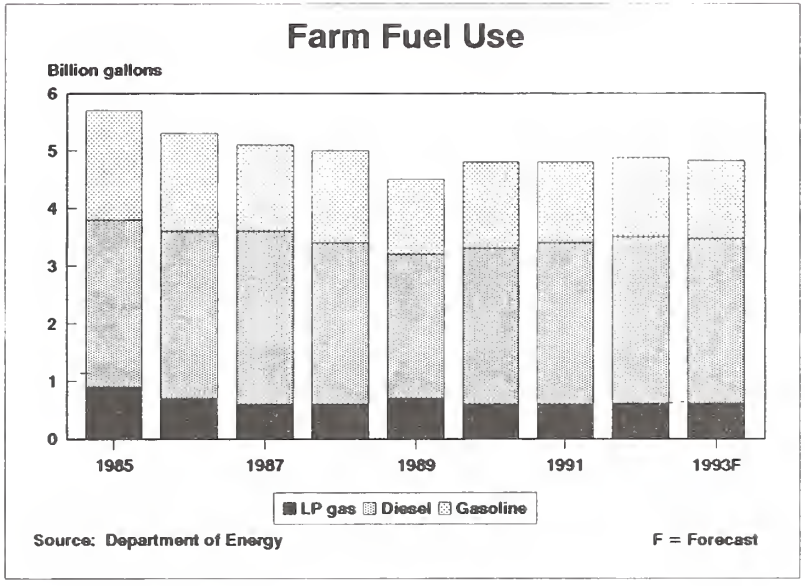


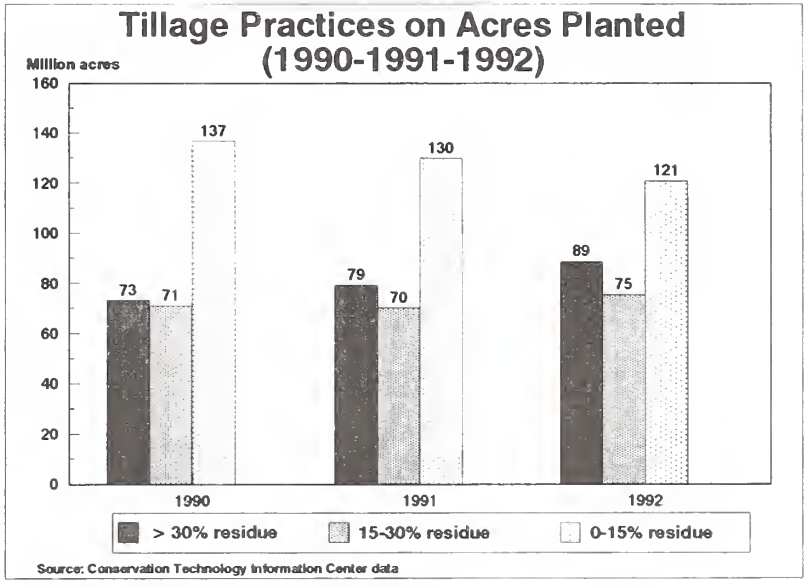
Agricultural Chemical Price Index




Tractor Unit Sales
Thousands
80
60
40
20
0
1983
1985
1987
1989
1991
1993F
40-99 hp
100 + hp
4wd
Source: Equipment Manufacters Institute
F=forecast


Sales of Self-Propelled Combines
Units
1,400
1,200
1,000
800
600
400
200
0
1991
1992
Jan
Mar
May
Jul
Sep
Nov
Source: Equipment Manufacters Institute


Farm Fuel Use
Billion gallons
6
5
4
3
2
1
0
1985
1987
1989
1991
1993F
LP gas
Diesel
Gasoline
Source: Department of Energy
F = Forecast


Tillage Practices on Acres Planted
(1990-1991-1992)
Million acres
160
140
120
100
80
60
40
20
0
73
71
137
79
70
130
89
75
121
1990
1991
1992
> 30% residue
15-30% residue
0-15% residue
Source: Conservation Technology Information Center data