

Table B.1—Fertilizer use on crops 1/

Crop	Area not treated	Area treated	Area receiving—			Quantities applied		
			Nitrogen	Phosphate	Potash	Nitrogen	Phosphate	Potash
			<i>1,000 acres</i>			<i>1,000 pounds</i>		
Corn	874	79,353	79,425	67,391	47,763	10,335	3,823	4.656
Cotton	1,129	12,679	12,427	9,251	8,009	1,051	434	571
Wheat	8,973	62,016	61,831	45,149	12,707	3,957	1,404	521
Soybeans	44,154	26,696	14,170	19,838	23,381	368	1,001	2,131
Subtotal for following	834	7,133	5,200	5,239	5,237	1,112	589	687
Potatoes	-	1,362	1,362	1,335	1,239	322	240	194
Vegetables 2/	494	3,032	1,099	2,705	2,320	489	292	275
Citrus 2/	20	1,130	1,130	579	860	177	26	148
Apples 2/	104	349	349	167	200	22	6	11
Other fruit 2/, 3/	216	1,260	1,260	453	618	102	24	59
Total	55,964	187,877	173,053	146,868	107,097	16,823	7,250	8,566

- = None reported or insufficient data available to make an estimate.

¹Constructed to represent 244 million acres of 1997 U.S. cropland. Estimates were constructed using 1997 planted crop acres for all crops and fertilizer use rates from the 1997 Agricultural Resource Management Study (corn, cotton, wheat, soybeans, and potatoes), the 1995 Fruit Chemical Use Survey, and the 1994 Vegetable Chemical Use Survey.

²Treated area includes only the area treated with nitrogen.

³Excludes citrus and apples, but includes other deciduous fruits and berries.

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1998b; USDA National Agricultural Statistics Service and Economic Research Service, 1996b; and USDA, National Agricultural Statistics Service and Economic Research Service, 1995a.

Table B.2—Nutrient application rates on field crops, 1990-97

Nutrient/crop	1990	1991	1992	1993	1994	1995	1996	1997
	<i>Pounds/acre</i>							
Nitrogen:								
Corn	132	128	127	123	129	129	133	132
Cotton	86	91	88	90	110	96	98	83
Wheat	59	62	63	64	67	59	57	59
Soybeans	23	24	20	20	24	28	24	21
Potatoes	231	230	242	271	240	251	220	268
Phosphate:								
Corn	61	60	57	56	57	56	59	57
Cotton	44	46	48	47	43	43	44	43
Wheat	36	36	34	34	35	30	29	29
Soybeans	48	48	46	46	47	55	49	54
Potatoes	184	187	192	210	176	199	196	218
Potash:								
Corn	84	81	79	79	81	81	82	81
Cotton	47	49	56	58	55	51	58	52
Wheat	44	43	39	35	38	20	28	19
Soybeans	85	78	76	81	81	88	86	93
Potatoes	139	137	148	168	170	163	147	153

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1995c, 1996a, and 1997b. Represents planted corn area in IL, IN, IA, MI, MN, MO, NE, OH, SD, and WI; cotton area in AZ, AR, CA, LA, MS, and TX; wheat area in CO, KS, MT, NE, OK, SD, TX, and WA; soybean area in AR, IL, IN, IA, MN, MO, NE, and OH; and potato area in ID, ME, and WA.

Table B.3—Nutrient management practices

Item (unit)	Total	Corn	Soybeans	Wheat	Cotton	Potatoes	Oranges	Apples	Grapes	Peaches	Tomatoes	Strawberries
Represented crop area (000 acres)	196,337	62,150	62,215	55,865	13,080	990	671	329	743	144	104	46
Time of nitrogen applications:												
Amount applied in Fall (000 lbs)	3,703	1,694	109	1,684	187	29	na	na	na	na	na	na
Amount applied in												
Spring before planting (000 lbs)	6,092	4,572	193	946	286	95	na	na	na	na	na	na
Amount applied in												
Spring after planting (000 lbs)	3,226	1,857	33	669	567	100	na	na	na	na	na	na
Total	12,991	8,123	335	3,299	1,010	224	na	na	na	na	na	na
Area with only fall application												
(000 acres)	30,231	7,851	3,699	16,759	1,880	42	na	na	na	na	na	na
Amount applied (000 lbs)	2,304	1,083	97	997	119	8	na	na	na	na	na	na
Area with only spring												
applications (000 acres)	80,758	44,677	9,085	17,984	8,324	688	na	na	na	na	na	na
Amount applied (000 lbs)	7,891	5,722	181	1,125	707	156	na	na	na	na	na	na
Area with split applications between												
fall and spring (000 acres)	25,908	8,980	505	14,467	1,747	209	na	na	na	na	na	na
Amount Fall applied (000 lbs)	1,400	611	12	687	69	21	na	na	na	na	na	na
Amount Spring applied (000 lbs)	1,398	707	46	491	115	39	na	na	na	na	na	na
Livestock manure usage: ¹												
Area receiving (000 acres)	15,675	10,325	3,607	1,234	337	25	41	10	73	12	2	9
Manure analyzed for												
nutrients (000 acres)	1,122	800	193	107	108	12	na	na	na	2	na	na
Soil nutrient testing: ¹												
Tested for pH or nutrient												
status (000 acres)	59,221	26,459	15,226	12,610	3,171	945	381	119	184	51	52	23
Tested for nitrogen content												
(000 acres)	37,278	14,603	6,450	11,607	2,998	888	369	115	183	na	44	21
Area treated with nitrogen												
stabilizer (000 acres) ¹	na	6,366	na	na	na	na	na	na	na	na	na	na

na = No data available to make estimate.

¹Estimates for livestock manure usage and soil nutrient testing for corn, soybeans, wheat, cotton, and potatoes are from the 1995 Cropping Practices Survey representing 64.1, 51.8, 53.0, 11.7, 1.1 million acres, respectively. Estimates for area treated with nitrogen stabilizers are from the 1996 Cropping Practices Survey representing 61.5 million acres of corn.

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1996c, 1996d, and 1994.

Table B.4—Pest management practices on selected crops

Item (unit)	Total	Corn	Soybeans	Wheat	Cotton	Potatoes	Oranges	Apples	Grapes	Peaches	Tomatoes	Strawberries
1,000 acres												
Planted crop area	187,738	69,755	50,665	52,965	11,650	666	671	329	743	144	104	46
Scouting for pests	144,895	51,283	38,705	42,488	10,216	572	602	277	509	102	96	45
Scouted by operator or employee	116,469	42,031	34,428	35,364	3,723	133	327	108	262	27	39	27
Scouted by chemical dealer	9,020	3,240	2,290	1,898	833	259	162	100	165	53	15	5
Scouted by a professional service	9,958	1,780	432	1,817	5,504	144	79	53	77	21	39	12
Dollars												
Average cost per acre	3.46	4.52	3.28	2.78	6.00	na	na	na	na	na	na	na
1,000 acres												
Scouted by other	9,448	4,232	1,555	3,409	156	36	34	16	5	1	3	1
Soil and plant tissue testing for pests	6,460	2,052	1,498	1,101	1,034	361	173	37	151	12	32	9
Pheromone traps to monitor pests	3,453	na	na	108	2,854	na	107	227	92	47	16	2
Weed mapping for preventive treatments	20,486	9,294	7,197	1,563	2,432	na	na	na	na	na	na	na
Planting resistant varieties/rootstock	33,271	na	na	28,745	4,204	na	85	32	86	63	39	17
Protection of beneficial insects	23,376	na	na	13,252	8,921	149	407	264	231	59	66	27
Purchasing/releasing beneficial insects	557	na	na	326	108	8	53	3	39	1	3	16
Adjustment of planting dates	22,551	na	na	18,789	3,751	na	na	na	na	na	11	0
Pheromone use for pest control	1,389	na	na	92	1,140	na	20	50	36	30	21	0
Seed treatments with pesticides	93,827	49,382	12,247	22,761	9,437	na	na	na	na	na	na	na
Alternating pesticides to reduce occurrence of pesticide-resistant species	103,712	41,896	33,457	20,492	6,227	509	409	248	269	96	76	33
Decision strategies for pesticide application decisions:												
Use of pest thresholds	82,689	16,280	14,219	39,857	10,729	517	489	183	304	4	73	34
Preventive or routine schedule treatments	48,078	24,999	14,253	7,512	794	48	108	133	183	13	26	9
Requirement of processor and/or sales contract	32	na	na	na	na	na	3	1	16	0	6	6
Information sources used for pest management:												
Extension Service	10,061	na	na	8,362	1,302	na	119	63	160	32	15	8
Chemical dealer	35,235	na	na	30,501	3,805	na	359	160	306	47	38	19
Professional scouting service	10,653	na	na	4,457	5,763	na	133	75	120	44	45	16
Media or demonstration events	2,947	na	na	2,559	331	na	31	7	11	6	1	1
Other information sources	6,417	na	na	5,806	425	na	28	21	123	9	2	3
Produced using organic system	2,718	950	573	886	264	15	1	6	22	1	0	0

na = No data available to make estimate.

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1995c, 1995d, and 1994

Table B.5—Overall pesticide use on selected U.S. crops by pesticide type, 1990-97 1/

Item	1990	1991	1992	1993	1994	1995	1996	1997
<i>Million pounds of active ingredients</i>								
Herbicides	344.6	335.2	350.5	323.5	350.6	324.9	365.7	366.4
Insecticides	57.4	52.8	60.0	58.1	68.2	69.9	59.2	60.5
Fungicides	27.8	29.4	34.9	36.6	43.6	47.5	46.8	50.5
Other pesticides	67.9	60.1	72.7	80.0	101.1	101.0	104.0	110.2
Total	497.7	477.5	518.2	498.2	563.4	543.3	575.8	587.6
<i>Million cropland acres</i>								
Area represented	228.5	226.0	231.5	226.6	232.8	228.0	242.1	243.8
Total cropland used for crops	341.0	337.0	337.0	330.0	339.0	332.0	346.0	353.0
<i>Pounds of active ingredient per planted acre</i>								
Herbicides	1.508	1.483	1.514	1.428	1.505	1.425	1.5111	1.502
Insecticides	.251	.234	.259	.256	.293	.306	.245	.248
Fungicides	.121	.130	.151	.161	.187	.208	.193	.207
Other pesticides	.297	.266	.314	.353	.434	.443	.430	.452
Total	2.178	2.113	2.238	2.199	2.419	2.383	2.379	2.410
<i>Percent</i>								
Share of cropland represented 2/	67	67	69	69	69	69	70	69

1/ Estimates include corn, soybeans, wheat, cotton, potatoes, other vegetables, citrus fruit, apples, and other fruit.

2/ Share of total for the selected crops to total cropland used for crops.

Source: Lin, Biing, M. Padgitt, L., Bull, H. Delvo, D. Shank, and H. Taylor 1995 (prior to 1993); unpublished USDA survey data (following 1993).

Table B.6—Estimated quantity of pesticide active ingredient applied to selected U.S. crops, 1990-97 1/

Item/commodity	1990	1991	1992	1993	1994	1995	1996	1997
<i>Million pounds of herbicides</i>								
Herbicides	344.6	335.2	350.5	323.5	350.6	324.9	365.7	366.4
Corn	217.5	210.2	224.4	202.0	215.6	186.3	211.6	211.8
Cotton	21.1	26.0	25.8	23.6	28.6	32.9	27.7	29.2
Wheat	16.6	13.6	17.4	18.3	20.7	20.0	30.5	24.3
Soybeans	74.4	69.9	67.4	64.1	69.3	68.1	77.8	83.7
Potatoes	2.4	2.5	2.2	2.5	2.9	2.9	2.9	2.4
Other vegetables	4.9	4.7	5.8	5.7	6.2	7.2	7.7	7.5
Citrus	5.7	6.1	5.5	5.1	4.8	4.7	4.6	4.5
Apples	.4	.4	.4	.4	.6	.8	.8	.9
Other deciduous	1.7	1.7	1.7	1.8	2.0	2.0	2.1	2.1
<i>Million pounds of insecticides</i>								
Corn	23.2	23.0	20.9	18.5	17.3	15.0	16.1	17.5
Cotton	13.6	8.2	15.3	15.4	23.9	30.0	18.7	19.3
Wheat	1.0	.2	1.2	.2	2.0	.9	2.3	1.2
Soybeans	.	.4	.4	.3	.2	.5	.4	.8
Potatoes	3.6	3.6	3.5	3.9	4.4	3.1	2.5	3.3
Other vegetables	4.7	4.5	5.5	5.3	5.7	5.7	5.4	5.3
Citrus	2.8	4.0	4.5	5.3	5.1	5.2	5.3	5.5
Apples	3.7	4.0	3.9	4.1	3.8	3.5	3.4	3.3
Other deciduous	4.8	4.9	4.9	5.0	5.6	6.0	5.2	4.4
<i>Million pounds of fungicides</i>								
Corn	.	.	.	.	.	.	.	.
Cotton	1.0	0.7	0.8	0.7	1.1	1.0	0.5	0.9
Wheat	.2	.1	1.2	.7	1.0	.5	.2	.1
Soybeans	.	.	.1	.	.	.	.	.
Potatoes	2.8	3.2	3.6	4.4	6.3	8.0	7.2	10.8
Other Vegetables	12.9	13.1	17.3	18.7	22.3	24.4	25.0	24.4
Citrus	2.6	3.6	3.4	3.3	3.6	4.0	4.0	4.0
Apples	4.2	4.5	4.4	4.6	4.6	4.6	5.3	6.0
Other deciduous	4.1	4.2	4.2	4.2	4.7	4.9	4.6	4.4
<i>Million pounds of other pesticides</i>								
Corn	.	.	.	.	.	.	.	.
Cotton	15.2	15.5	15.8	12.7	15.6	19.7	18.7	18.5
Wheat	.	.	.	.	.	.	.	.
Soybeans	.	.	.	.	.	.	.	.
Potatoes	35.1	26.2	32.3	39.7	50.6	39.1	36.9	42.0
Other vegetables	17.3	18.0	24.2	27.5	34.0	40.6	44.7	43.5
Citrus	.	.	.	.	.1	.2	.6	1.1
Apples	.1	.1	.1	.1	.1	.1	.1	.1
Other deciduous	.3	.3	.3	.	.7	1.3	3.1	5.0
<i>Million pounds of all pesticide types</i>								
Corn	240.7	233.2	245.2	220.5	233.0	201.3	227.7	229.3
Cotton	50.9	50.3	57.6	52.3	69.1	83.7	65.6	68.0
Wheat	17.8	13.8	19.7	19.1	23.8	21.5	32.9	25.7
Soybeans	74.4	70.4	67.8	64.4	69.5	68.7	78.1	84.5
Potatoes	43.8	35.6	41.6	50.5	64.2	53.1	49.5	58.5
Other vegetables	39.8	40.3	52.8	57.3	68.2	78.0	82.8	80.7
Citrus	11.0	13.7	13.5	13.7	13.6	14.0	14.5	15.0
Apples	8.3	9.1	8.8	9.3	9.1	9.0	9.7	10.3
Other deciduous	10.9	11.1	11.1	11.0	12.9	14.1	14.9	15.9

. = None reported or too little reported to make an estimate.

1/ Estimates are constructed for the total U.S. acreage of the selected commodities. In years when the surveys did not include all States producing the crop, the estimates assume similar use rates for those States.

Source: Lin, Bing, M. Padgett, L., Bull, H. Delvo, D. Shank, and H. Taylor 1995 (prior to 1993); unpublished USDA survey data (following 1993).

Table B.7—Acres treated with leading pesticide ingredients

Item	Total	Corn	Soybean	All wheat	Cotton	Fall potatoes	Selected vegetables	Selected fruit
<i>1,000 acres 2/</i>								
Planted area	204,285	62,150	66,215	55,865	13,075	944	2,748	3,001
Herbicides: 1/								
Atrazine (r)	43,232	42,809	4	100	0	0	319	0
Glyphosate	31,634	2,982	18,688	4,632	3,451	46	231	1,605
2,4-D	31,438	5,747	5,397	20,113	53	1	28	99
Metolachlor	27,659	21,855	4,818	0	622	77	277	0
Dicamba	25,872	18,119	6	7,634	112	0	1	0
Imazethapyr	25,492	667	24,823	0 0	0	61	2	
Trifluralin	24,279	336	13,805	2,586	7,104	46	393	9
Pendimethalin	21,928	1,564	16,382	0	3,612	246	124	0
Acetochlor (r)	14,839	14,839	0	0	0	0	0	0
Thifensulfuron	10,907	985	5,658	4,264	0	0	0	0
Cyanazine (r)	10,827	8,469	0	1	2,303	0	54	0
MCPA	10,108	0	0	10,108	0	0	0	0
Fenoxaprop-ethyl	10,051	0	4,144	5895	12	0	0	0
Bentazon	9,360	2,110	7,130	0	0	0	120	0
Chlorminuron-ethyl	8,882	0	8,882	0	0	0	0	0
Imazaquin	8,761	0	8,761	0	0	0	0	0
Metribuzin	8,335	356	6,594	663	0	620	102	0
Acifluorfen	7,831	0	7,831	0	0	0	0	0
Bromoxymil	7,265	4,022	0	3,089	107	0	47	0
Tribenuron-methyl	7,166	0	53	7,113	0	0	0	0
Nicosulfuron	6,209	6,197	0	0	0	0	12	0
Metsulfuron-methyl	6,115	0	0	6,115	0	0	0	0
Fluzaifop-butyl	6,043	0	5,272	0	739	0	31	1
Alachlor (r)	4,552	2,549	1,890	0	0	0	113	0
Chlorsulfuron	3,825	0	0	3,825	0	0	0	0
Insecticides: 1/								
Chlorpyrifos (r)	6,362	4,356	130	548	551	1	205	572
Methyl parathion (r)	5,262	2,316	413	595	1,633	4	85	216
Tefluthrin (r)	4,243	4,239	0	0	0	0	4	0
Permethrin (r)	3,676	2,932	33	0	30	37	58	62
Aldicarb (r)	3,661	0	0	0	3,522	86	0	53
Lamdacvalothrin (r)	3,384	532	204	79	2,380	0	189	0
Cyfluthrin (r)	2,690	884	0	0	1,695	0	3	108
Terbufos (r)	2,375	2,359	0	0	0	0	16	0
Dimethoate	2,064	123	148	1,007	316	101	304	64
Carbofuran (r)	2,128	1,451	13	47	351	204	27	36
Oxamyl (r)	2,071	0	0	0	1,925	1	82	63
Malathion (r)	1,689	0	6	99	1,459	0	33	92
Phorate (r)	1,528	368	0	44	899	217	0	0
Bt	1,380	515	7	0	274	0	323	261
Imidacloprid	1,431	0	0	0	830	159	256	186
Acephate	1,509	0	60	0	1,240	0	209	0
Chlorethoxyfos (r)	1,178	1,178	0	0	0	0	0	0
Azinophos-methyl (r)	1,154	0	0	0	636	75	17	426
Dicrctophos (r)	1,060	0	0	0	1,060	0	0	0
Abamectin (r)	1,085	0	0	0	481	0	132	472

1/ The letter 'r' in parentheses identifies ingredients that are restricted-use products. Restrictions may apply to only some formulations of the ingredient.

2/ Area treated one or more times with the ingredient.

Sources: USDA, National Agricultural Statistics Service and Economic Research Service, 1996c, 1995d, and 1994.

Table B.8—Change in pesticide use indicators, by crop and pesticide type, 1990-97

Item	Planted area	Share treated	Avg. treat-ments	Rate	Planted	Percent area	No. acres treated	Rate per acre
	1,000 ac.	Percent	No.	Lbs/acre	Index: 1990=100			
Corn (total pesticides):								
1990	58,800	96.5	2.5	1.42	100	100	100	100
1991	60,350	96.8	2.5	1.30	103	100	99	91
1992	62,850	97.9	2.6	1.21	107	101	103	85
1993	57,350	98.0	2.7	1.22	98	101	106	86
1994	62,500	98.4	2.8	1.06	106	102	112	75
1995	55,850	98.1	2.8	1.04	95	102	112	74
1996	61,500	98.2	3.0	1.00	105	102	119	71
1997	62,150	97.4	3.2	.93	106	101	126	66
Soybeans (total pesticides):								
1990	39,500	96.0	2.3	.61	100	100	100	100
1991	42,062	96.9	2.3	.58	107	101	100	94
1992	41,350	98.3	2.4	.48	105	102	104	78
1993	42,500	97.6	2.5	.44	108	102	109	72
1994	43,750	98.5	2.8	.42	111	103	121	69
1995	45,150	97.7	2.8	.39	114	102	123	63
1996	45,950	97.5	2.9	.43	116	102	128	69
1997	49,250	97.7	2.9	.43	125	102	126	71
Cotton (total pesticides):								
1991	10,860	97.6	6.7	.55	100	100	100	100
1992	10,200	98.1	8.2	.52	94	100	123	94
1993	10,360	98.7	8.8	.50	95	101	133	91
1994	10,023	98.9	10.7	.49	92	101	161	88
1995	11,650	99.6	11.0	.48	107	102	165	87
1996	10,025	96.5	9.2	.51	92	99	138	92
1997	9,265	99.8	9.1	.53	85	102	136	95
Wheat (total pesticides):								
1990	52,500	58.7	1.8	.27	100	100	100	100
1991	43,450	56.3	2.0	.24	82	96	109	88
1992	49,950	58.6	1.9	.23	95	100	107	87
1993	50,450	64.5	2.1	.21	96	110	118	78
1994	49,450	72.7	2.1	.23	94	124	116	86
1995	47,540	74.8	2.2	.20	91	127	122	74
1996	46,160	73.5	2.5	.25	88	125	139	93
1997	50,700	66.1	2.6	.23	97	113	143	87
Potatoes (total pesticides):								
1990	605	99.3	5.6	6.85	100	100	100	100
1991	620	99.6	5.9	7.35	103	100	104	107
1992	586	99.8	6.5	8.44	97	101	115	123
1993	616	100.0	6.6	10.32	102	101	116	151
1994	640	99.0	8.1	11.99	106	100	144	175
1995	625	99.0	9.6	8.91	103	100	170	130
1996	641	98.9	9.4	13.37	106	99	167	195
1997	609	96.8	12.6	7.9	101	98	223	115

—Continued

Table B.8—Change in pesticide use indicators, by crop and pesticide type, 1990-97—Continued

Item	Planted area	Share treated	Avg. treat- ments	Rate	Planted	Percent area	No. acres treated	Rate per acre
	<i>1,000 ac.</i>	<i>Percent</i>	<i>No.</i>	<i>Lbs/acre</i>	<i>Index: 1990=100</i>			
Herbicides:								
1990	161,135	82.7	2.2	.92	100	100	100	100
1991	157,330	84.7	2.2	.88	98	102	103	95
1992	164,936	84.5	2.3	.80	102	102	107	86
1993	161,276	86.6	2.4	.73	100	105	112	79
1994	166,363	88.8	2.6	.69	103	107	119	74
1995	160,815	90.35	2.6	.63	100	109	120	69
1996	164,276	89.4	2.7	.66	102	108	127	71
1997	171,974	87.3	2.8	.63	107	106	130	68
Insecticides:								
1991	157,330	18.7	1.8	.57	100	100	100	100
1992	164,936	16.5	2.3	.48	105	88	131	85
1993	161,276	15.1	2.6	.47	103	81	148	83
1994	166,363	17.0	2.8	.44	106	91	158	78
1995	160,815	16.3	3.5	.38	102	87	197	66
1996	164,276	19.5	2.2	.43	104	104	123	76
1997	171,974	17.0	2.3	.48	109	91	129	85
Fungicides:								
1991	157,330	1.0	1.8	.65	100	100	100	100
1992	164,936	1.4	1.8	.64	105	140	100	99
1993	161,276	1.2	2.0	.67	103	120	114	104
1994	166,363	1.1	2.8	.72	106	110	155	112
1995	160,815	1.5	2.6	.65	102	150	144	100
1996	164,276	1.1	2.7	.65	104	110	154	100
1997	171,974	0.9	3.9	.75	109	90	218	115
Other pesticides:								
1991	157,330	4.1	2.4	2.15	100	100	100	100
1992	164,936	3.1	2.3	3.40	105	76	98	158
1993	161,276	4.2	2.1	3.36	103	102	90	156
1994	166,363	4.2	2.6	3.69	106	102	109	172
1995	160,815	4.3	2.6	3.40	102	105	112	158
1996	164,276	3.9	2.7	4.98	104	95	115	231
1997	171,974	3.9	2.4	3.79	109	95	103	176

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1995c.

Table B.9—Pesticide application methods used on major field crops, and selected fruits and vegetables, by pesticide type

Item	Ground broadcast	Aerial broadcast	Chemigation	Band or spot treatment	Injected into soil	Alternate row spraying	Total
<i>1,000 acre-treatments</i>							
All pesticide types:							
Wheat	64,733	17,906	.	499	603	.	83,741
Soybeans	132,492	2,534	37	9,603	1,016	.	145,681
Cotton	53,292	47,596	120	18,590	5,513	.	125,112
Corn	140,434	6,046	423	21,551	7,196	.	175,651
Potatoes	5,586	4,636	1,881	425	309	.	12,837
Tomatoes	177	124	0	2,220	65	.	2,586
Lettuce	485	1,054	17	100	7	.	1,664
Strawberries	125	7	1	301	25	.	459
Apples	4,330	103	3	49	.	1,155	5,639
Grapes	2,480	90	25	83	.	318	2,996
Peaches	3,217	94	0	224	.	987	4,521
Oranges	4,582	72	46	303	.	8	5,011
Total	411,933	80,261	2,555	53,948	14,735	2,468	565,900
<i>Percent</i>							
Share of total	72.8	14.2	.4	9.5	2.6	.4	100
<i>1,000 acre-treatments</i>							
Herbicides:							
Wheat	63,286	16,133	.	454	603	.	80,476
Soybeans	131,831	2,112	.	9,564	1,016	.	144,523
Cotton	20,550	2,015	79	13,053	1,386	.	37,083
Corn	136,603	2,083	.	14,582	1,977	.	155,245
Potatoes	1,168	201	508	26	27	.	1,931
Tomatoes	18	0	.	77	.	.	96
Lettuce	72	47	.	13	.	.	132
Strawberries	15	1	.	12	0	.	28
Apples	233	3	.	14	.	8	257
Grapes	284	1	.	65	.	20	371
Peaches	300	7	.	90	.	16	412
Oranges	1,937	19	46	231	.	4	2,237
Total	356,297	22,621	634	38,182	5,010	48	422,792
Insecticides:							
Wheat	934	1,137	.	45	.	.	2,116
Soybeans	583	391	37	39	.	.	1,050
Cotton	25,735	36,156	41	4,190	2,624	.	68,746
Corn	3,725	3,964	423	6,969	5,219	.	20,300
Potatoes	998	1,047	168	191	232	.	2,637
Tomatoes	72	66	0	873	0	.	1,011
Lettuce	353	994	17	64	7	.	1,436
Strawberries	57	4	0	94	0	.	155
Apples	2,249	35	.	19	.	588	2,891
Grapes	212	2	25	15	.	13	267
Peaches	1,463	43	0	88	.	483	2,078
Oranges	1,845	35	0	21	.	.	1,901
Total	38,226	43,874	713	12,608	8,083	1,085	104,589
Fungicides:							
Wheat	513	636	.	.	.	.	1,149
Soybeans	77	31	.	.	.	.	108
Cotton	42	24	.	542	1,233	.	1,842
Corn	106	.	.	.	.	.	106
Potatoes	2,779	3,227	1,075	168	2	.	7,251
Tomatoes	87	58	0	1,267	.	.	1,412
Lettuce	60	13	.	23	.	.	95
Strawberries	52	1	1	191	0	.	245

See note at end of table

—Continued

Table B.9—Pesticide application methods used on major field crops, and selected fruits and vegetables, by pesticide type—Continued

Item	Ground broadcast	Aerial broadcast	Chemigation	Band or spot treatment	Injected into soil	Alternate row spraying	Total
<i>1,000 acre-treatments</i>							
Apples	1,466	26	3	11	.	549	2,055
Grapes	1,967	78	.	1	.	285	2,332
Peaches	1,426	44	.	46	.	486	2,002
Oranges	692	14	.	5	.	.	710
Total	9,267	4,151	1,079	2,254	1,235	1,320	19,307
Other pesticides:							
Cotton	6,965	9,401	.	805	270	.	17,442
Potatoes	641	162	129	39	48	.	1,019
Tomatoes	0	.	.	2	65	.	67
Strawberries	1	1	.	4	25	.	31
Apples	382	39	.	6	.	9	436
Grapes	17	8	.	1	.	.	26
Peaches	28	.	.	0	.	2	30
Oranges	108	4	.	46	.	4	162
Total	8,143	9,615	129	903	408	15	19,213

. = None reported or insufficient data to develop an estimate.

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1996c, 1995d, and 1994.

Table B.10—Monoculture and crop rotation systems used in the production of major field crops, 1997

State	Area in monoculture system					Area in crop rotation				
	Wheat	Soybeans	Cotton	Corn	Potatoes	Wheat	Soybeans	Cotton	Corn	Potatoes
<i>1,000 acres</i>										
AL	.	.	277	.	.	.	.	258	.	.
AZ	.	.	191	.	.	.	.	121	.	.
AR	.	1,348	814	.	.	.	2,252	74	.	.
CA	.	.	359	.	.	.	.	521	.	.
CO	50	.	.	.	.	2,798	.	.	.	.
DE	.	1	.	.	.	.	153	.	.	.
GA	.	.	536	.	.	.	.	904	.	.
ID	100	.	.	.	3	770	.	.	.	384
IL	25	112	.	1,151	.	1,122	9,854	.	9,987	.
IN	.	203	.	317	.	.	5,226	.	5,508	.
IA	.	.	.	867	.	.	10,058	.	11,027	.
KS	5,351	446	.	.	.	5,649	2,004	.	.	.
KY	.	96	.	.	.	.	1,177	.	.	.
LA	.	347	472	.	.	.	1,053	158	.	.
ME	.	.	.	.	6	.	.	.	.	62
MI	.	43	.	709	.	.	1,857	.	1,891	.
MN	.	.	.	519	1	2,450	6,730	.	6,468	73
MS	.	1,113	858	.	.	.	987	127	.	.
MO	92	876	292	74	.	932	3,988	88	2,849	.
MT	178	.	.	.	.	5,622	.	.	.	.
NE	105	14	.	4,471	.	1,795	3,455	.	4,451	.
NC	.	27	323	.	.	.	1,373	334	.	.
ND	.	.	.	.	.	10,231	.	.	.	120
OH	3	343	.	340	.	1,087	4,157	.	3,260	.
OK	4,632	.	.	.	.	705	.	.	.	.
OR	48	.	.	.	0	791	.	.	.	54
PA	1	9	.	.	.	174	356	.	.	.
SC	.	.	110	.	.	.	.	180	.	.
SD	154	313	.	219	.	3,394	3,187	.	3,578	.
TN	.	293	435	.	.	.	964	49	.	.
TX	2,468	.	3,213	.	.	1,632	.	2,145	.	.
WA	491	.	.	.	2	1,609	.	.	.	116
WI	.	.	.	634	.	.	1,000	.	3,166	69
Total	13,698	5,586	7,882	9,301	12	42,167	60,404	5,198	52,849	932
<i>Percent in monoculture</i>										
AL	.	.	52	.	.	.	.	48	.	.
AZ	.	.	61	.	.	.	.	39	.	.
AR	.	37	92	.	.	.	63	8	.	.
CA	.	.	41	.	.	.	.	59	.	.
CO	2	.	.	.	.	98	.	.	.	.
DE	.	1	.	.	.	.	99	.	.	.
GA	.	.	37	.	.	.	.	63	.	.
ID	12	.	.	.	1	88	.	.	.	99
IL	2	1	.	10	.	98	99	.	90	.
IN	.	4	.	5	.	.	96	.	95	.
IA	.	.	.	7	.	.	100	.	93	.
KS	49	18	.	.	.	51	82	.	.	.
<i>Percent in crop rotations</i>										
AL	.	.	52	.	.	.	.	48	.	.
AZ	.	.	61	.	.	.	.	39	.	.
AR	.	37	92	.	.	.	63	8	.	.
CA	.	.	41	.	.	.	.	59	.	.
CO	2	.	.	.	.	98	.	.	.	.
DE	.	1	.	.	.	.	99	.	.	.
GA	.	.	37	.	.	.	.	63	.	.
ID	12	.	.	.	1	88	.	.	.	99
IL	2	1	.	10	.	98	99	.	90	.
IN	.	4	.	5	.	.	96	.	95	.
IA	.	.	.	7	.	.	100	.	93	.
KS	49	18	.	.	.	51	82	.	.	.

See note at end of table

—Continued

Table B.10—Monoculture and crop rotation systems used in the production of major field crops, 1997—Continued

State	Area in monoculture system					Area in crop rotation				
	Wheat	Soybeans	Cotton	Corn	Potatoes	Wheat	Soybeans	Cotton	Corn	Potatoes
	<i>Percent in monoculture</i>					<i>Percent in crop rotations</i>				
KY	.	8	.	.	.	.	92	.	.	.
LA	.	25	75	.	.	.	75	25	.	.
ME	.	.	.	.	9	.	.	.	.	91
MI	.	2	.	27	.	.	98	.	73	.
MN	.	.	.	7	1	100	100	.	93	99
MS	.	53	87	.	.	.	47	13	.	.
MO	9	18	77	3	.	91	82	23	97	.
MT	3	.	.	.	.	97	.	.	.	.
NE	6	0	.	50	.	94	100	.	50	.
NC	.	2	49	.	.	.	98	51	.	.
ND	.	.	.	.	.	100	.	.	.	100
OH	0	8	.	9	.	100	92	.	91	.
OK	87	.	.	.	.	13	.	.	.	.
OR	6	.	.	.	.	94	.	.	.	100
PA	1	2	.	.	.	99	98	.	.	.
SC	.	.	38	.	.	.	.	62	.	.
SD	4	9	.	6	.	96	91	.	94	.
TN	.	23	90	.	.	.	77	10	.	.
TX	60	.	60	.	.	40	.	40	.	.
WA	23	.	.	.	1	77	.	.	.	99
WI	.	.	.	17	.	.	100	.	83	100
Total	25	8	60	15	1	75	92	40	85	99

. = None or insufficient data to develop an estimate.

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1996c.

Table B.11—Crop rotation systems used in the production of major field crops, 1997

State	Continuous wheat	Wheat-fallow	Wheat rotation systems				Double-cropped	Total
			Continuous small grains	Mix of row crop and small grain	With meadow crops	With idle land		
1,000 acres								
CO	50	2,099	.	614	2	84	.	2,848
ID	100	54	275	337	104	.	.	870
IL	25	5	7	1,053	.	.	57	1,147
KS	5,351	1,972	1,062	2,158	229	.	228	11,000
MN	.	121	1,294	1,036	.	.	.	2,450
MO	92	6	.	688	9	.	228	1,024
MT	178	3,239	1,658	72	125	527	.	5,800
NE	105	727	126	811	131	.	.	1,900
ND	.	1,191	5,456	2,899	184	502	.	10,231
OH	3	.	7	995	5	1	79	1,090
OK	4,632	58	304	279	3	.	61	5,337
OR	48	626	55	86	23	.	.	840
PA	1	.	6	155	6	1	6	175
SD	154	749	583	1,556	295	201	9	3,548
TX	2,468	187	135	1,261	45	.	5	4,100
WA	491	1,007	202	327	3	70	.	2,100
Total	13,698	12,041	11,169	14,326	1,166	1,386	673	54,460
Percent in each rotation								
CO	2	74	.	22	0	3	.	100
ID	12	6	32	39	12	.	.	100
IL	2	0	1	92	.	.	5	100
KS	49	18	10	20	2	.	2	100
MN	.	5	53	42	.	.	.	100
MO	9	1	.	67	1	.	22	100
MT	3	56	29	1	2	9	.	100
NE	6	38	7	43	7	.	.	100
ND	.	12	53	28	2	5	.	100
OH	0	.	1	91	0	0	7	100
OK	87	1	6	5	0	.	1	100
OR	6	75	7	10	3	.	.	100
PA	1	.	3	89	3	1	3	100
SD	4	21	16	44	8	6	0	100
TX	60	5	3	31	1	.	0	100
WA	23	48	10	16	0	3	.	100
Total	25	22	21	26	2	3	1	100

See note at end of table

—Continued

Table B.11—Crop rotation systems used in the production of major field crops, 1997–Continued

			Soybean rotation systems					
	Continuous soybeans	Corn-soybeans	Continuous row crops	Mix of row crop and small grain	With meadow crops	With idle land	Double-cropped	Total
1,000 acres								
CO	50	2,099	.	614	2	84	.	2,848
AR	1,348	49	7	1,373	.	.	822	3,600
DE	1	10	50	.	.	3	90	155
IL	112	7,755	1,064	.	420	293	322	9,966
IN	203	3,854	740	10	86	171	364	5,429
IA	.	9,126	770	22	100	40	.	10,058
KS	446	452	651	16	58	514	313	2,450
KY	96	366	237	.	5	119	449	1,273
LA	347	90	685	162	.	21	94	1,400
MI	43	503	549	12	.	463	329	1,900
MN	.	4,735	1,135	655	184	21	.	6,730
MS	1,113	110	148	321	60	18	330	2,100
MO	876	1,420	652	341	64	936	575	4,865
NE	14	1,899	1,156	14	42	345	.	3,470
NC	27	172	375	3	22	218	582	1,400
OH	343	1,441	1,955	5	56	699	.	4,500
PA	9	133	131	7	50	25	11	365
SD	313	1,627	204	472	18	854	12	3,500
TN	293	194	173	.	6	28	564	1,258
WI	.	411	492	34	56	8	.	1,000
Total	5,586	34,347	11,176	3,448	1,226	4,776	4,859	65,418
Percent in each rotation								
AR	37	1	0	38	.	.	23	100
DE	1	7	33	.	.	2	58	100
IL	1	78	11	.	4	3	3	100
IN	4	71	14	0	2	3	7	100
IA	.	91	8	0	1	0	.	100
KS	18	18	27	1	2	21	13	100
KY	8	29	19	.	0	9	35	100
LA	25	6	49	12	.	1	7	100
MI	2	26	29	1	.	24	17	100
MN	.	70	17	10	3	0	.	100
MS	53	5	7	15	3	1	16	100
MO	18	29	13	7	1	19	12	100
NE	0	55	33	0	1	10	.	100
NC	2	12	27	0	2	16	42	100
OH	8	32	43	0	1	16	.	100
PA	2	36	36	2	14	7	3	100
SD	9	46	6	13	1	24	0	100
TN	23	15	14	.	0	2	45	100
WI	.	41	49	3	6	1	.	100
Total	9	53	17	5	2	7	7	100

See note at end of table.

—Continued

Table B.11—Crop rotation systems used in the production of major field crops, 1997–Continued

State	Continuous cotton	Cotton rotation systems				Total
		Continuous row crops	Mix of row crop and small grain	With meadow crops	With idle land	
1,000 acres						
AL	277	207	37	9	6	535
AZ	191	26	49	16	30	312
AR	814	40	34	.	.	888
CA	359	219	36	129	136	880
GA	536	756	.	.	148	1,440
LA	472	158	.	.	0	630
MS	858	106	.	.	20	985
MO	292	88	.	.	.	380
NC	323	325	5	.	4	657
SC	110	130	.	2	48	290
TN	435	49	.	.	.	484
TX	3,213	1,820	.	55	270	5,358
Total	7,882	3,923	162	210	662	12,839
Percent in each rotation						
AL	52	39	7	2	1	100
AZ	61	8	16	5	10	100
AR	92	5	4	.	.	100
CA	41	25	4	15	15	100
GA	37	53	.	.	10	100
LA	75	25	.	.	0	100
MS	87	11	.	.	2	100
MO	77	23	.	.	.	100
NC	49	49	1	.	1	100
SC	38	45	.	1	17	100
TN	90	10	.	.	.	100
TX	60	34	.	1	5	100
Total	61	31	1	2	5	100

See note at end of table

—Continued

Table B.11—Crop rotation systems used in the production of major field crops, 1997–Continued

Cotton rotation systems							
	Continuous corn	Corn-soybeans	Continuous row crops	Mix of row crop and small grain	With meadow crops	With idle land	Total
State							
1,000 acres							
IL	1,151	7,515	2,182	12	99	178	11,138
IN	317	4,031	1,148	1	94	233	5,825
IA	867	9,277	884	112	507	246	11,894
MI	709	509	645	26	101	610	2,600
MN	519	4,712	577	382	554	244	6,988
MO	74	987	1,457	12	123	270	2,923
NE	4,471	2,414	1,287	10	234	505	8,922
OH	340	1,761	623	.	193	682	3,600
SD	219	1,807	768	584	90	328	3,797
WI	634	1,098	434	19	1,441	173	3,800
Total	9,301	34,113	10,006	1,160	3,437	3,470	61,486
Percent in each rotation							
IL	10	67	20	0	1	2	100
IN	5	69	20	0	2	4	100
IA	7	78	7	1	4	2	100
MI	27	20	25	1	4	23	100
MN	7	67	8	5	8	3	100
MO	3	34	50	0	4	9	100
NE	50	27	14	0	3	6	100
OH	9	49	17	.	5	19	100
SD	6	48	20	15	2	9	100
WI	17	29	11	1	38	5	100
Total	15	55	16	2	6	6	100
Potato rotation systems							
	Continuous potatoes	Continuous row crops	Mix of row crop and small grain	With meadow crops	With idle land	Total	
State							
1,000 acres							
ID	3	6	204	21	154	387	
ME	6	3	49	4	5	68	
MN	1	10	58	2	3	74	
ND	.	10	70	16	24	120	
OR	0	6	15	9	25	54	
WA	2	67	5	19	26	118	
WI	.	48	11	8	3	69	
Total	12	151	410	79	239	891	
Percent in each rotation							
ID	1	1	53	5	40	100	
ME	9	5	73	6	7	100	
MN	1	14	78	3	4	100	
ND	.	9	58	13	20	100	
OR	0	11	27	16	46	100	
WA	1	57	4	16	22	100	
WI	.	70	15	11	4	100	
Total	1	17	46	9	27	100	

. = None reported or insufficient data available to make an estimate.

Source: USDA, National Agricultural Statistics Service and Economic Research Service, 1996c.