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## Rothamsted Experimental Station Report for 1987

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### Use of Fertilizers in England and Wales, 1987

**J. I. Elsmere**

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## Use of fertilizers in England and Wales, 1987

J. I. ELSMERE

This series of annual surveys continued in 1987 as a collaborative project between ADAS Soil Scientists, representatives of the Fertiliser Manufacturers' Association and Rothamsted. A sample of 1165 farms was surveyed by Farm Research Limited on behalf of the Fertiliser Manufacturers' Association during June, July and early August. A similar survey was again done in Scotland, with the collaboration of the Scottish Colleges, on a sample of 267 farms. The results of this survey will be reported elsewhere.

Compared with 1986, the survey estimates for England and Wales show very little change in 1987 of total use of N, P and K per hectare for all crops and grass (Table 1). Total use of straight N on winter cereals has increased slightly this year, the use of compound N remaining the same as last year. However, the proportion of the area receiving any N in compound continues to decrease. During the last three years, this area has decreased from 67% to 38% for winter wheat and from 79% to 46% for winter barley. The amount of any N fertilizer being applied to winter cereals between October and December has decreased from 3.4% in 1985 to 2.4% in 1987. Similarly in February, the amount of N applied has dropped from 8.7% to 6.9%.

**TABLE 1**  
*Fertilizer use on tillage crops and grassland (kg ha<sup>-1</sup>) 1984-87*

	Tillage crops				Grassland				All crops and grass			
	1984	1985	1986	1987	1984	1985	1986	1987	1984	1985	1986	1987
N Straight	128	134	133	136	71	70	77	75	99	102	106	105
Compound	34	27	24	25	61	62	57	58	48	44	40	41
Total	162	161	156	160	132	131	135	133	147	146	146	147
P <sub>2</sub> O <sub>5</sub>	61	56	56	56	25	24	22	23	42	40	40	39
K <sub>2</sub> O	68	63	62	63	33	32	33	33	50	48	48b	48

**TABLE 2**  
*Fertilizer use on winter wheat, winter barley and spring barley (kg ha<sup>-1</sup>) 1984-87*

	Winter wheat				Winter barley				Spring barley			
	1984	1985	1986	1987	1984	1985	1986	1987	1984	1985	1986	1987
N Straight	171	181	178	183	131	136	136	140	44	53	58	48
Compound	16	11	8	9	18	15	12	12	54	49	45	51
Total	187	192	186	192	150	150	148	151	98	102	103	99
P <sub>2</sub> O <sub>5</sub>	56	54	56	54	57	55	54	55	39	38	37	38
K <sub>2</sub> O	53	52	52	52	59	58	59	58	44	44	44	43

Total N use on spring barley has decreased this year to 99 kg ha<sup>-1</sup>, which is similar to that applied in 1984. However, this year, use of compound N has increased from 45 kg ha<sup>-1</sup> to 51 kg ha<sup>-1</sup> after decreasing gradually during the previous four years. Straight N, however, which has been fluctuating recently, decreased from 58 kg ha<sup>-1</sup> in 1986 to 48 kg ha<sup>-1</sup> in 1987.

Average N use on sugar beet at 127 kg ha<sup>-1</sup> continues to fluctuate but remains at the lower level reached in 1985. This is, however, still above general recommendations. Average use of P and K per hectare has fallen slightly this year to 58 kg ha<sup>-1</sup> and 135 kg ha<sup>-1</sup> for P and K respectively.

For all tillage crops, use of P and K per hectare has remained steady since 1985 at 56 kg ha<sup>-1</sup> for P and 63 kg ha<sup>-1</sup> for K.

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Average use of total N on grass decreased slightly this year to 133 kg ha<sup>-1</sup>. Use of N on grassland is very much determined by how the grass is managed in that particular year, and varies from 212 kg ha<sup>-1</sup> on grass cut for silage down to 106 kg ha<sup>-1</sup> on grass that is grazed only.

The average amounts of fertilizer nutrients used per hectare in 1987 on individual tillage crops, and on grassland classified according to utilization, and the proportions of each crop which got different amounts of nutrients are summarized in Tables 3-8 at the end of this paper.

The following table shows the average amounts of fertilizer nutrients used per hectare in 1987 on individual tillage crops, and on grassland classified according to utilization, and the proportions of each crop which got different amounts of nutrients are summarized in Tables 3-8 at the end of this paper.

TABLE 3

Crop	Fertilizer N (kg ha <sup>-1</sup> )			Fertilizer P (kg ha <sup>-1</sup> )			Fertilizer K (kg ha <sup>-1</sup> )		
	1987	1986	1985	1987	1986	1985	1987	1986	1985
Wheat	100	100	100	10	10	10	10	10	10
Barley	100	100	100	10	10	10	10	10	10
Maize	100	100	100	10	10	10	10	10	10
Grass	100	100	100	10	10	10	10	10	10

TABLE 4

Crop	Fertilizer N (kg ha <sup>-1</sup> )			Fertilizer P (kg ha <sup>-1</sup> )			Fertilizer K (kg ha <sup>-1</sup> )		
	1987	1986	1985	1987	1986	1985	1987	1986	1985
Wheat	100	100	100	10	10	10	10	10	10
Barley	100	100	100	10	10	10	10	10	10
Maize	100	100	100	10	10	10	10	10	10
Grass	100	100	100	10	10	10	10	10	10

TABLE 5

Crop	Fertilizer N (kg ha <sup>-1</sup> )			Fertilizer P (kg ha <sup>-1</sup> )			Fertilizer K (kg ha <sup>-1</sup> )		
	1987	1986	1985	1987	1986	1985	1987	1986	1985
Wheat	100	100	100	10	10	10	10	10	10
Barley	100	100	100	10	10	10	10	10	10
Maize	100	100	100	10	10	10	10	10	10
Grass	100	100	100	10	10	10	10	10	10



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TABLE 3  
Fertilizer use in England and Wales, 1987

Fields	Hectares ('000)	Overall*(kg ha <sup>-1</sup> )			% Area receiving			Actual*(kg ha <sup>-1</sup> )			
		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P	K FYM	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	
Spring wheat	109	138	34	37	99	69	68	13	139	49	54
Winter wheat	3239	192	54	52	100	84	78	13	193	64	66
Spring barley	1007	99	38	43	98	89	90	25	101	42	47
Winter barley	1555	151	55	58	100	90	86	19	152	61	68
Spring oats	60	71	39	37	90	89	88	45	79	44	42
Winter oats	117	104	49	49	95	88	85	20	109	56	58
Rye	34	118	31	70	98	71	90	12	121	43	78
Maize	28	88	39	40	88	82	78	82	100	48	51
Early potatoes	58	179	176	243	100	100	100	55	179	176	243
Maincrop potatoes	346	204	221	289	99	99	99	41	207	223	291
Sugar beet	478	127	58	135	99	85	95	27	128	68	143
Oilseed rape	592	264	59	54	99	90	82	7	265	66	66
Swedes (stock)	35	75	83	64	94	92	92	25	80	90	70
Turnips (stock)	58	75	48	42	93	71	68	35	81	67	61
Kale and cow cabbage	55	109	42	53	92	81	82	51	119	52	65
Rape for stockfeed	22	77	34	45	100	88	100	29	77	39	45
Beans for stockfeed	221	12	33	32	16	49	47	6	76	68	68
Other stockfeed	90	31	45	53	40	74	72	19	78	61	74
Peas for human consumption	286	1	28	33	9	49	50	9	14	58	65
Broad beans	27	2	34	42	11	64	61	18	19	54	68
Runner and French beans	37	37	60	94	98	87	87	3	139	69	108
Brussels sprouts	43	250	103	210	99	99	99	15	252	104	211
Cabbages	34	163	71	140	90	81	83	35	180	88	170
Cauliflower	63	216	69	141	98	68	68	10	220	102	207
Onions	40	137	127	181	99	98	99	12	139	130	184
Small fruit	68	60	39	59	66	63	72	11	90	62	82
Top fruit	89	72	13	38	89	53	59	1	81	25	64
All tillage	9144	160	56	63	94	84	81	17	172	67	79
1 year leys	60	186	33	54	94	62	72	33	199	53	75
2-7 year leys	2478	194	31	54	95	73	76	48	203	43	71
Permanent grass	3464	101	18	22	80	56	56	38	127	32	40
All crops and grass	15146	147	39	48	89	73	72	29	164	54	67

\*The average application of any fertilizer component over all fields including those receiving none is termed 'overall'. The average excluding fields with none of the component is termed 'actual'.

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TABLE 4

Percentages of crop area getting different amounts of N ( $\text{kg ha}^{-1}$ )

	Fields	0	>25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+
Spring wheat	109	1	0	2	0	20	17	21	32	4	3	0	0
Winter wheat	3239	0	0	0	0	2	3	11	37	39	6	0	0
Spring barley	1007	2	1	9	18	24	23	16	6	1	0	0	0
Winter barley	1555	0	0	1	2	7	15	25	40	9	1	0	0
Spring oats	60	10	3	14	36	21	7	7	0	2	0	0	0
Winter oats	117	5	0	7	9	27	20	20	13	0	0	0	0
Rye	34	2	0	9	9	7	19	31	19	5	0	0	0
Maize	28	12	1	8	25	28	10	6	1	8	0	0	0
Early potatoes	58	0	1	5	1	0	1	16	36	39	1	0	0
Maincrop potatoes	346	1	0	0	0	1	4	8	34	33	15	3	0
Sugar beet	478	1	0	5	4	12	21	34	19	2	1	0	0
Oilseed rape	592	1	0	0	0	0	1	1	5	24	44	23	0
Swedes (stock)	35	6	6	4	42	13	22	6	1	0	0	0	0
Turnips (stock)	58	7	11	22	20	11	10	11	8	0	0	0	0
Kale and cow cabbage	55	8	2	10	4	24	22	5	24	0	1	1	0
Rape for stockfeed	22	0	0	40	25	21	0	14	0	0	0	0	0
Beans for stockfeed	221	84	6	3	0	1	0	1	5	0	0	0	0
Other stockfeed	90	60	11	2	6	7	5	6	2	0	0	0	0
Peas for human consumption	286	91	8	1	0	0	0	0	0	0	0	0	0
Broad beans	27	89	9	2	0	0	0	0	0	0	0	0	0
Runner and French beans	37	2	0	0	2	12	31	22	30	0	1	0	0
Brussels sprouts	43	1	0	0	0	0	8	8	10	8	49	11	5
Cabbages	34	10	0	11	0	8	2	21	9	24	9	1	5
Cauliflower	63	2	0	9	0	0	0	14	1	45	13	12	4
Onions	40	1	2	1	13	13	20	4	33	6	5	3	0
Small fruit	68	34	11	9	8	14	13	6	1	1	3	0	0
Top fruit	89	11	5	14	31	9	8	17	4	0	0	0	0
All tillage	9144	6	1	2	4	6	9	14	27	22	7	2	0
1 year leys	60	6	0	6	10	3	8	5	11	28	8	6	8
2-7 year leys	2478	5	1	8	7	9	5	9	13	12	10	16	6
Permanent grass	3464	20	3	16	11	12	8	7	7	4	5	5	1
All crops and grass	15146	11	1	8	7	8	8	11	18	14	7	5	2

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TABLE 5  
Percentages of crop area getting different amounts of  $P_2O_5$  ( $kg\ ha^{-1}$ )

	Fields	0	>25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+
Spring wheat	109	31	9	31	25	4	0	0	0	0	0	0	0
Winter wheat	3239	16	2	16	49	13	3	1	0	0	0	0	0
Spring barley	1007	11	20	45	21	2	0	0	0	0	0	0	0
Winter barley	1555	10	4	18	54	11	2	0	0	0	0	0	0
Spring oats	60	11	19	44	24	1	0	0	2	0	0	0	0
Winter oats	117	12	5	26	50	7	0	0	0	0	0	0	0
Rye	34	29	0	63	8	0	0	0	0	0	0	0	0
Maize	28	18	9	53	11	6	0	4	0	0	0	0	0
Early potatoes	58	0	0	0	1	9	4	13	43	22	8	1	0
Maincrop potatoes	346	1	0	0	0	3	2	8	27	31	16	12	1
Sugar beet	478	15	2	30	30	11	6	5	1	0	0	0	0
Oilseed rape	592	10	2	15	56	13	3	1	2	0	0	0	0
Swedes (stock)	35	8	0	25	17	15	9	20	1	4	1	0	0
Turnips (stock)	58	29	14	19	16	7	7	2	6	0	0	0	0
Kale and cow cabbage	55	19	13	29	32	7	0	0	0	0	0	0	0
Rape for stockfeed	22	12	40	22	26	0	0	0	0	0	0	0	0
Beans for stockfeed	221	51	1	8	28	9	1	0	1	1	0	0	0
Other stockfeed	90	26	6	26	28	5	7	1	1	0	0	0	0
Peas for human consumption	286	51	0	16	26	6	1	0	0	0	0	0	0
Broad beans	27	36	5	25	34	0	0	0	0	0	0	0	0
Runner and French beans	37	13	0	40	21	10	15	1	0	0	0	0	0
Brussels sprouts	43	1	0	6	53	7	3	8	15	3	0	4	0
Cabbages	34	19	2	16	22	22	1	8	0	10	0	0	0
Cauliflower	63	32	0	6	23	9	11	15	0	5	0	0	0
Onions	40	2	2	3	4	37	11	0	37	0	1	3	0
Small fruit	68	37	10	35	6	4	5	2	0	0	0	2	0
Top fruit	89	47	32	15	6	0	0	0	0	0	0	0	0
All tillage	9144	16	5	20	42	10	2	1	1	1	0	0	0
1 year leys	60	38	14	29	7	7	2	4	0	0	0	0	0
2-7 year leys	2478	27	26	26	13	4	1	1	1	0	0	0	0
Permanent grass	3464	44	32	15	6	1	1	1	1	0	0	0	0
All crops and grass	15146	27	17	19	25	6	2	1	1	1	0	0	0



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TABLE 6  
Percentages of crop area getting different amounts of  $K_2O$  ( $kg\ ha^{-1}$ )

Fields	0	>25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+
Spring wheat	32	8	27	24	6	4	0	0	0	0	0	0
Winter wheat	22	2	14	42	14	4	1	0	0	0	0	0
Spring barley	10	15	41	28	3	2	1	0	0	0	0	0
Winter barley	14	3	12	49	15	5	1	0	0	0	0	0
Spring oats	60	12	18	46	25	0	0	0	0	0	0	0
Winter oats	117	15	4	20	48	13	0	0	0	0	0	0
Rye	34	10	0	17	36	19	0	0	1	0	0	0
Maize	28	22	6	45	16	9	0	1	0	0	0	0
Early potatoes	58	0	0	0	0	1	9	18	28	29	16	0
Maincrop potatoes	346	1	0	0	0	1	1	8	21	27	35	6
Sugar beet	478	5	0	2	7	18	17	20	17	2	0	0
Oilseed rape	592	18	1	12	53	11	3	1	0	0	0	0
Swedes (stock)	35	8	20	17	17	4	10	1	4	0	0	0
Turnips (stock)	58	32	16	12	23	4	4	0	0	0	0	0
Kale and cow cabbage	55	18	14	26	23	4	3	0	0	0	0	0
Rape for stockfeed	22	0	20	59	14	0	7	0	0	0	0	0
Beans for stockfeed	221	53	0	7	29	7	1	1	0	0	0	0
Other stockfeed	90	28	4	11	38	7	6	2	1	3	0	0
Peas for human consumption	286	50	0	9	30	10	1	0	0	0	0	0
Broad beans	27	39	0	9	45	3	4	0	0	0	0	0
Runner and French beans	37	13	0	16	19	14	0	10	28	0	0	0
Brussels sprouts	43	1	0	0	8	0	2	4	29	45	3	4
Cabbages	34	17	2	12	4	0	7	6	9	42	0	0
Cauliflower	63	32	0	0	2	0	1	12	12	16	2	0
Onions	40	1	1	2	3	18	5	10	31	17	8	3
Small fruit	68	28	1	24	7	8	2	2	2	0	2	0
Top fruit	89	41	19	6	24	0	5	0	5	0	0	0
All tillage	9144	19	4	16	37	12	4	2	2	1	1	0
1 year leys	60	28	11	9	12	31	1	0	7	1	0	0
2-7 year leys	2478	24	17	17	15	8	7	4	2	1	0	0
Permanent grass	3464	44	27	16	8	2	2	1	1	0	0	0
All crops and grass	15146	28	13	16	24	8	4	2	1	1	1	0

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TABLE 7  
Fertilizer use on grassland classified by utilization †

Fields	%Grassland area	Overall*(kg ha <sup>-1</sup> )			% Area receiving				Actual*(kg ha <sup>-1</sup> )		
		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P	K	FYM	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Paddock grazed not mown	2	187	21	19	88	51	54	30	213	41	35
54 mown	1	253	35	86	98	69	76	44	259	51	114
All paddock grazed	3	206	25	38	91	56	60	34	227	44	64
Strip grazed not mown	1	257	40	31	100	61	51	48	258	66	60
85 mown	2	181	35	51	98	80	79	69	185	43	64
All strip grazed	3	215	37	42	99	71	66	59	218	52	63
Set stocked not mown	16	160	21	23	87	57	57	34	184	37	40
696 mown	10	212	31	62	97	71	79	58	218	43	79
All set stocked	26	180	25	38	91	62	66	44	198	40	59
Other grazings not mown	38	76	16	16	73	53	52	27	104	30	30
1927 mown	27	143	27	48	94	73	76	61	152	37	63
All other grazings	64	104	20	29	82	61	62	41	127	33	47
All grazings	96	131	22	32	85	62	63	42	154	36	51
Cut for seed not grazed	0	254	33	50	95	62	68	0	268	54	73
22 grazed	0	160	58	36	100	70	63	6	160	82	57
All cut for seed	0	200	47	42	98	67	65	4	205	71	64
Cut for silage not grazed	2	265	42	84	96	82	89	32	277	50	95
1082 extensively grazed	15	187	31	64	97	79	83	69	192	40	77
624 intensively grazed	9	243	34	76	99	78	87	65	246	44	88
All cut for silage	26	212	33	70	98	79	85	65	216	42	82
Cut for hay not grazed	1	129	28	34	91	51	51	22	142	55	67
58 extensively grazed	11	80	20	25	89	64	64	49	90	31	39
248 intensively grazed	4	127	24	29	93	60	63	45	136	40	45
All cut for hay	15	94	21	26	90	62	63	47	104	34	42
All mowings	42	169	29	54	95	73	77	58	178	40	70
Not stated/Not used	2	58	20	19	61	50	49	16	95	40	38
All grass	100	132	22	33	85	62	63	41	156	36	52

\*The average application of any fertilizer component over all fields including those receiving none is termed 'overall'. The average excluding fields with none of the component is termed 'actual'.  
†Note that fields which are both grazed and mown will appear in both grazing and mowing sections of the table.



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TABLE 8

Percentages of crop area getting different amounts of N ( $\text{kg ha}^{-1}$ )

Fields	0	>25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+
<b>Paddock grazed</b>												
not mown	187	12	3	13	9	3	9	2	4	3	15	13
mown	54	2	0	4	0	4	0	1	11	23	31	12
All paddock grazed	241	9	2	11	7	3	6	1	6	9	20	12
<b>Strip grazed</b>												
not mown	73	0	0	1	2	6	6	2	7	13	21	38
mown	85	2	0	8	0	10	4	21	19	15	11	7
All strip grazed	158	1	0	5	1	8	5	13	13	14	16	21
<b>Set stocked</b>												
not mown	761	13	3	9	7	9	9	8	9	6	8	13
mown	696	3	0	3	4	9	6	9	16	15	10	17
All set stocked	1457	9	2	7	6	9	8	12	10	9	14	6
<b>Other grazings</b>												
not mown	1944	27	2	22	12	11	6	6	6	3	1	3
mown	1927	6	3	12	13	13	7	10	10	8	9	8
All other grazings	3871	18	2	18	13	12	6	8	8	5	5	1
All grazings	5727	15	2	14	10	11	7	8	9	7	7	3
<b>Cut for seed</b>												
not grazed	21	5	2	0	0	8	0	29	12	5	14	0
grazed	22	0	0	0	6	5	4	26	33	22	2	0
All cut for seed	43	2	1	0	4	7	3	28	24	15	7	0
<b>Cut for silage</b>												
not grazed	146	4	0	0	1	1	5	4	18	14	13	26
grazed extensively	1082	3	1	6	8	11	6	9	13	12	15	13
grazed intensively	624	1	0	2	2	6	4	6	16	19	14	9
All cut for silage	1852	2	0	4	6	8	5	8	14	14	15	17
<b>Cut for hay</b>												
not grazed	58	9	0	8	15	16	3	10	25	5	0	7
grazed extensively	786	11	5	21	19	17	9	10	6	2	1	1
grazed intensively	248	7	3	9	7	15	11	20	12	7	5	2
All cut for hay	1092	10	4	17	16	16	9	13	8	3	2	1
All mowings	2997	5	2	9	9	11	7	10	12	11	10	11
Not stated/Not used	70	39	12	5	9	11	12	4	5	1	1	2
All grass	6032	15	2	14	10	10	7	8	9	7	7	8