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## Rothamsted Experimental Station Report for 1984

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### Use of Fertilizers in England and Wales, 1984

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## Use of fertilizers in England and Wales, 1984

B. M. CHURCH

The series of annual surveys done by staff of the ADAS Regional Soil Scientists and representatives of the Fertiliser Manufacturers' Association in collaboration with Rothamsted was continued in 1984, when a sample of 1352 farms was surveyed in England and Wales (Church & Lewis, 1977). It may perhaps be noted here that similar surveys of fertilizer practice were done on samples of 250 farms in Scotland in 1983 and in 1984 by representatives of the Fertiliser Manufacturers' Association, and that the 1983 results have been reported elsewhere (Church & Leech, 1984).

Compared with 1983, the survey data for England and Wales show an estimated increase of 6% in N use per hectare crops and grass, with corresponding increases of almost 8 and 14% in P and K per hectare. There have been average increases over the last four years of about 5, 3 and 6% per year in use of N, P and K per hectare crops and grass (Table 1). Straight N use per hectare has increased by a third since 1980 at an average of about 7.5% per year but use of N in compounds has changed little over this period.

TABLE 1  
Fertilizer use on tillage crops and grassland ( $\text{kg ha}^{-1}$ ), 1980–84\*

	Tillage crops				Grassland				All crops and grass			
	1980	1982	1983	1984	1980	1982	1983	1984	1980	1982	1983	1984
N Straight	77	99	116	128	69	71	69	71	73	85	91	99
Compound	44	42	37	34	50	52	57	61	47	47	48	48
Total	121	141	154	162	119	123	126	132	120	132	139	147
P <sub>2</sub> O <sub>5</sub>	49	55	54	61	27	24	26	25	37	39	39	42
K <sub>2</sub> O	54	61	60	68	26	28	28	33	40	44	44	50

\* Comparable data for 1981 are in the 1983 Rothamsted Report

Following the pattern of recent years, the increase in use of straight N between 1983 and 1984 was mainly on tillage crops, on which use of N in compounds continued to decline. These changes are partly explained by the continuing move from spring to winter sown cereals (about a quarter spring-sown in 1983, declining to about 15% in 1984). On grassland, use of straight N has hardly changed over the last four years but N use in compounds has increased by 10% a year since 1982. The increase in use of P between 1983 and 1984 was on tillage crops only, as has been the case since 1980, but K use continued to increase on both tillage crops and grassland.

On winter wheat, use of straight N per hectare was at least maintained, and use of both P and K is estimated to have increased sharply in 1984 (Table 2). On spring barley N use was at

TABLE 2  
Fertilizer use on winter wheat and spring barley ( $\text{kg ha}^{-1}$ ), 1980–84

	Winter wheat				Spring barley			
	1980	1982	1983	1984	1980	1982	1983	1984
N Straight	126	148	167	171	24	34	51	44
Compound	19	18	16	16	63	60	57	54
Total	145	162	182	187	87	94	107	98
P <sub>2</sub> O <sub>5</sub>	46	49	51	56	37	38	39	39
K <sub>2</sub> O	39	42	46	53	40	41	44	44

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TABLE 3  
Fertilizer use in England and Wales, 1984

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	35	132	26	28	98	56	56	7	135	47	51	
Winter wheat	2867	187	56	53	99	88	83	11	189	63	63	
Spring barley	1127	98	39	44	98	91	93	24	100	42	47	
Winter barley	1589	150	57	59	100	95	93	13	150	61	64	
Spring oats	66	72	33	35	91	84	84	25	79	39	42	
Winter oats	149	114	56	59	98	97	97	11	116	58	60	
Rye	40	123	40	49	98	94	93	3	126	42	52	
Maize	25	89	35	49	81	72	80	53	110	49	61	
Early potatoes	67	185	202	220	100	100	100	58	185	202	220	
Maincrop potatoes	335	214	228	278	99	99	99	40	216	230	281	
Sugar beet	414	148	74	160	98	94	98	28	150	79	164	
Oilseed rape	422	279	63	60	99	97	89	5	281	65	68	
Swedes (stock)	68	56	93	79	97	99	97	50	58	94	82	
Turnips (stock)	54	85	62	56	97	74	74	53	88	83	76	
Kale and cow cabbage	66	112	45	49	94	86	87	67	120	52	57	
Rape for stockfeed	43	75	104	46	99	99	99	26	76	105	46	
Beans for stockfeed	84	3	38	41	14	61	59	10	24	63	69	
Other stockfeed	82	77	51	62	85	93	94	37	90	55	65	
Peas for human consumption	156	3	26	32	15	49	51	7	21	53	63	
Broad beans	25	2	75	109	2	71	69	4	84	106	158	
Runner and French beans	34	107	56	94	81	76	84	4	133	73	113	
Brussels sprouts	35	257	78	193	97	94	94	8	266	84	206	
Cabbages	46	202	71	150	90	91	96	7	226	78	157	
Cauliflower	33	222	82	190	98	98	98	12	226	83	194	
Onions	33	147	105	148	99	94	98	12	149	112	151	
Small fruit	54	93	25	49	84	69	77	12	111	36	64	
Top fruit	110	55	19	39	74	46	45	9	74	40	85	
All tillage	8385	162	61	68	96	90	87	16	169	68	78	
2-7 year leys	2954	190	33	51	96	77	77	48	198	43	66	
Permanent grass	3666	102	20	23	80	60	60	38	128	34	39	
All crops and grass	15017	147	42	50	91	77	76	29	162	55	66	

\* 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 (kg ha<sup>-1</sup>)

	Fields	0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+
Spring wheat	35	2	0	7	0	9	11	44	24	3	0	0	0
Winter wheat	2867	1	1	1	1	2	3	10	40	33	8	0	0
Spring barley	1127	2	1	7	23	18	26	16	6	1	0	0	0
Winter barley	1589	0	2	1	2	6	11	27	42	7	1	0	0
Spring oats	66	9	3	13	32	21	17	4	0	0	0	0	0
Winter oats	149	2	4	6	11	15	14	22	26	0	0	0	0
Rye	40	2	3	6	5	6	27	37	19	1	0	0	0
Maize	25	19	0	6	1	22	27	13	11	0	0	0	0
Early potatoes	67	0	0	4	0	6	13	6	35	22	7	4	3
Maincrop potatoes	335	1	0	1	1	3	3	6	24	25	30	5	0
Sugar beet	414	2	0	0	3	7	19	35	22	7	2	3	0
Oilseed rape	422	1	0	0	0	0	0	1	2	12	44	38	0
Swedens (stock)	68	3	5	43	33	13	2	1	0	1	0	0	0
Turnips (stock)	54	3	1	17	30	13	24	8	4	0	0	0	0
Kale and cow cabbage	66	6	1	4	13	17	21	13	19	5	0	0	0
Rape for stockfeed	43	1	1	25	38	21	5	4	4	0	0	0	0
Beans for stockfeed	84	86	11	3	0	0	0	0	0	0	0	0	0
Other stockfeed	82	15	4	10	24	12	11	20	5	0	0	0	0
Peas for human consumption	156	85	13	2	0	0	0	0	0	0	0	0	0
Broad beans	25	98	0	0	0	2	0	0	0	0	0	0	0
Runner and French beans	34	19	10	3	0	3	13	19	31	0	1	0	0
Brussels sprouts	35	3	0	2	0	0	3	0	26	16	7	33	9
Cabbages	46	10	0	0	0	2	4	3	29	23	11	18	0
Cauliflower	33	2	0	1	0	3	11	23	7	7	20	19	7
Onions	33	1	3	1	0	11	18	21	20	21	0	2	0
Small fruit	54	16	13	7	9	6	14	4	29	1	0	0	0
Top fruit	110	26	7	30	10	12	1	5	5	3	0	1	0
All tillage	8385	4	1	3	5	6	9	15	30	18	7	3	0
2-7 year leys	2954	4	1	8	7	8	7	8	14	13	11	15	5
Permanent grass	3666	20	3	15	13	11	7	7	9	5	4	5	1
All crops and grass	15017	9	2	8	8	8	8	11	20	13	7	6	1

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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	35	44	7	32	17	0	1	0	0	0	0	0	0
Winter wheat	2867	12	2	18	53	13	2	0	0	0	0	0	0
Spring barley	1127	9	15	50	24	2	0	0	0	0	0	0	0
Winter barley	1589	5	2	22	57	10	2	0	0	0	0	0	0
Spring oats	66	16	16	52	15	0	1	0	0	0	0	0	0
Winter oats	149	3	3	30	55	6	0	2	0	0	0	0	0
Rye	40	6	28	36	30	0	0	0	0	0	0	0	0
Maize	25	28	0	38	30	4	0	0	0	0	0	0	0
Early potatoes	67	0	0	4	0	0	0	11	39	28	12	5	2
Maincrop potatoes	335	1	0	1	1	3	3	10	24	20	13	22	3
Sugar beet	414	6	3	26	32	10	7	8	6	1	0	0	0
Oilseed rape	422	3	1	11	72	9	3	1	0	1	0	0	0
Swedes (stock)	68	1	8	12	16	25	23	6	6	0	1	1	0
Turnips (stock)	54	26	10	22	13	5	13	5	4	0	4	0	0
Kale and cow cabbage	66	14	8	46	28	2	0	0	0	0	2	0	0
Rape for stockfeed	43	1	16	20	5	8	13	6	23	6	0	1	0
Beans for stockfeed	84	39	5	16	31	3	1	4	0	1	0	0	0
Other stockfeed	82	7	20	31	32	1	2	5	2	1	0	0	0
Peas for human consumption	156	51	3	20	18	6	1	0	0	0	0	0	0
Broad beans	25	29	0	1	20	21	23	0	0	5	0	0	0
Runner and French beans	34	24	8	17	26	9	9	2	0	4	0	0	0
Brussels sprouts	35	6	2	23	29	9	10	10	11	0	0	0	0
Cabbages	46	9	8	23	21	12	14	12	2	0	0	0	0
Cauliflower	33	2	8	2	40	23	14	7	2	3	0	0	0
Onions	33	6	17	17	6	5	7	6	22	15	0	0	0
Small fruit	54	31	15	48	2	0	2	0	0	1	0	0	0
Top fruit	110	54	18	24	3	0	1	0	0	1	0	0	0
All tillage	8385	10	4	22	46	10	2	1	2	1	1	1	0
2-7 year leys	2954	23	24	32	13	4	1	1	1	0	0	0	0
Permanent grass	3666	40	32	19	5	1	1	0	0	0	0	0	0
All crops and grass	15017	23	17	23	26	6	1	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	35	44	5	30	16	6	0	0	0	0	0	0	0
Winter wheat	2867	17	2	18	46	13	2	1	0	0	0	0	0
Spring barley	1127	7	11	43	33	5	0	0	0	0	0	0	0
Winter barley	1589	7	2	17	55	16	3	0	0	0	0	0	0
Spring oats	66	16	16	44	20	2	2	0	0	0	0	0	0
Winter oats	149	3	3	32	48	9	1	4	0	0	0	0	0
Rye	40	7	1	41	48	3	1	0	0	0	0	0	0
Maize	25	20	0	22	53	2	0	4	0	0	0	0	0
Early potatoes	67	0	0	0	1	12	13	4	9	25	17	16	3
Maincrop potatoes	335	1	0	1	0	1	2	1	6	17	30	39	2
Sugar beet	414	2	1	0	9	14	14	12	22	15	7	5	0
Oilseed rape	422	11	1	4	68	9	3	2	1	0	0	0	0
Sweeds (stock)	68	3	7	13	21	27	22	5	1	0	0	0	0
Turnips (stock)	54	26	6	17	17	15	15	1	4	0	0	0	0
Kale and cow cabbage	66	13	6	37	30	6	6	1	0	0	0	0	0
Rape for stockfeed	43	1	21	51	19	5	2	1	0	0	0	0	0
Beans for stockfeed	84	41	3	11	30	3	8	4	0	0	0	0	0
Other stockfeed	82	6	18	30	23	5	3	11	5	0	0	0	0
Peas for human consumption	156	49	2	7	32	7	1	1	0	0	0	0	0
Broad beans	25	31	0	2	10	0	0	20	32	5	6	0	0
Runner and French beans	34	16	3	3	35	17	2	7	1	5	6	4	0
Brussels sprouts	35	6	0	0	2	0	2	9	39	28	9	0	5
Cabbages	46	4	0	7	2	13	6	15	35	17	0	2	0
Cauliflower	33	2	0	0	0	3	7	3	52	28	3	3	0
Onions	33	2	0	7	13	2	6	22	29	13	5	0	0
Small fruit	54	23	11	33	3	13	13	2	1	0	0	1	0
Top fruit	110	55	5	19	3	1	0	16	1	0	0	0	0
All tillage	8385	13	3	18	42	12	3	2	2	2	1	2	0
2-7 year leys	2954	23	17	22	14	7	6	5	4	1	0	0	0
Permanent grass	3666	40	26	20	8	2	2	1	0	0	0	0	0
All crops and grass	15017	24	13	19	26	8	3	2	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	213	23	35	96	73	74	32	221	32	47	
Mown	1	180	26	49	98	76	83	54	184	35	59	
All paddock grazed	3	202	24	40	97	74	77	39	208	33	52	
Strip grazed												
Not mown	2	187	18	19	93	63	64	53	201	28	29	
Mown	3	206	31	60	97	78	84	83	212	40	71	
All strip grazed	4	198	25	42	95	71	75	70	207	36	56	
Set stocked												
Not mown	15	139	19	19	86	55	54	27	162	34	35	
Mown	9	180	31	52	96	75	77	53	187	41	67	
All set stocked	23	154	23	31	90	62	63	37	172	37	49	
Other grazings												
Not mown	39	85	21	19	75	61	59	28	113	35	33	
Mown	24	154	31	48	96	77	78	61	160	40	62	
All other grazings	63	111	25	30	83	67	66	41	134	37	46	
All grazings	94	129	24	31	86	66	66	41	150	37	48	
Cut for silage												
Not grazed	2	302	45	105	100	83	85	48	303	54	123	
Grazed extensively	11	202	37	67	100	85	88	68	203	43	77	
Grazed intensively	8	235	34	69	99	79	84	65	239	44	82	
All cut for silage	22	223	37	71	99	83	86	65	224	44	83	
Cut for hay												
Not grazed	1	85	21	23	90	60	58	41	94	35	40	
Grazed extensively	11	97	24	26	92	67	67	52	105	35	40	
Grazed intensively	5	113	25	29	94	72	73	51	119	34	40	
All cut for hay	17	101	24	27	93	69	68	51	109	35	40	
All mowings	40	171	31	52	96	77	78	59	177	41	66	
Not stated/not used	3	67	17	16	53	35	35	22	128	49	44	
All grass	100	131	25	32	85	66	66	41	154	38	49	

\*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 appear in both the grazing and mowing sections of the table.

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**TABLE 8**  
Percentages of grassland area getting different amounts of N ( $\text{kg ha}^{-1}$ )

	Fields	0	<25	25-	50-	75-	100-	125-	150-	200-	250-	300-	400+
Paddock grazed													
Not mown	153	4	3	6	7	11	3	8	10	1	11	27	7
Mown	84	2	0	9	7	10	15	2	15	7	13	18	1
All paddock grazed	237	3	2	7	7	11	7	6	12	3	12	24	5
Strip grazed													
Not mown	135	7	0	12	6	1	14	10	9	6	12	19	5
Mown	142	3	0	4	3	4	4	8	29	14	12	18	2
All strip grazed	277	5	0	7	4	3	8	9	20	11	12	18	3
Set stocked													
Not mown	876	14	1	10	14	11	7	8	8	7	6	9	4
Mown	730	4	1	8	10	10	9	6	13	12	10	14	4
All set stocked	1606	10	1	9	13	10	8	7	10	9	8	11	4
Other grazings													
Not mown	2289	25	4	17	13	10	5	6	7	5	2	3	1
Mown	1850	4	1	11	11	12	8	9	16	11	8	9	1
All other grazings	4139	17	3	15	12	11	7	7	10	7	5	5	1
All grazings	6259	14	2	13	12	10	7	7	11	8	6	8	2
Cut for silage													
Not grazed	155	0	1	0	1	1	1	12	2	12	19	31	19
Grazed extensively	943	0	1	3	5	6	8	10	20	18	11	15	2
Grazed intensively	602	1	0	1	2	5	6	6	18	16	15	24	5
All cut for silage	1700	1	1	2	4	5	7	9	18	17	13	20	4
Cut for hay													
Not grazed	85	10	1	25	13	15	19	6	6	1	1	3	0
Grazed extensively	851	8	2	20	18	19	9	7	10	3	4	1	0
Grazed intensively	402	6	2	15	16	14	13	5	15	7	3	2	1
All cut for hay	1338	7	2	19	17	17	10	7	12	4	4	2	0
All mowings	3069	4	1	9	9	10	9	8	15	11	9	12	3
Not stated/not used	160	47	3	6	7	14	3	5	4	7	1	3	1
All grass	6682	15	2	12	12	10	7	7	10	8	6	8	2



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about the level of 1981, but more of this N was applied straight in 1984. The latest results confirm the conjecture that N use on spring barley was exceptional in 1983 because of the spring rainfall pattern.

The average amounts of fertilizer nutrients used per hectare in 1984 on individual tillage crops, and on grassland classified according to utilization, and the proportions of each crop which got different amounts of nutrient are summarized in Tables 3–8 in this paper.

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