FertiliserStatistics2016

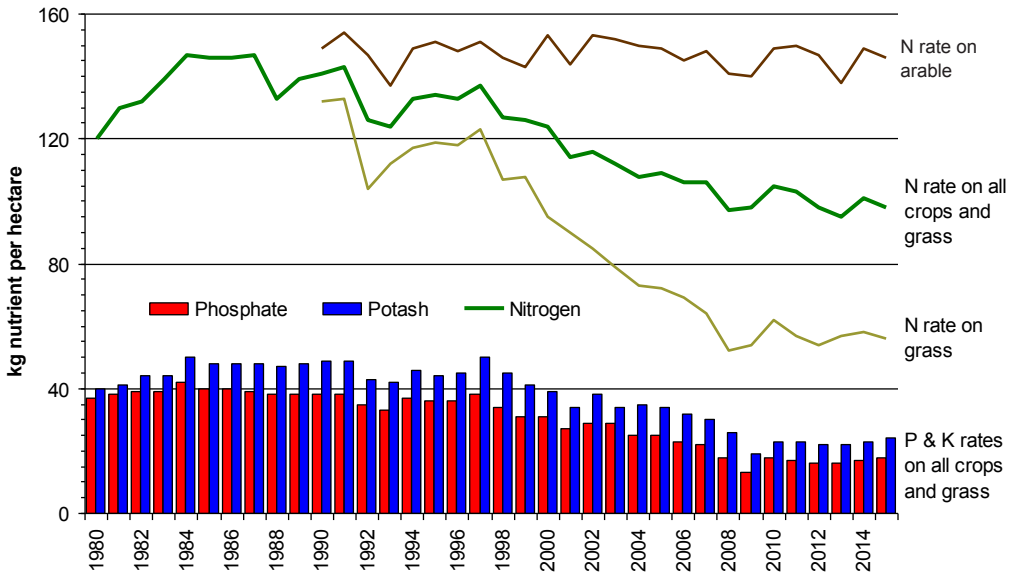
The year has seen lively technical debate on such topics as developing fertiliser recommendations and the use of soil analysis results to support nutrient management and fertiliser use on farm. What is clear is that nutrient management has returned to the forefront thanks to the partnership between industry and science led by the Agriculture and Horticulture Development Board (AHDB). It is good to see the boundaries of understanding being pushed, whilst not undermining what is good and solid.

New guidance on crop nutrition is due to be published in the coming year. Those working closely on the technical detail report excellent progress has been made in several areas including the crucial challenge of presenting sometimes quite complex decision-making processes. There are still ambitions to provide more information to further drive trends in nitrogen use efficiencies, already shown by trends in the British Survey of Fertiliser Practice which this report reflects. In addition, there is enthusiasm to improve the integration of nutrient management advice on livestock farms through professional advisory services. Not all of these challenges are easy to solve but now that funds and expertise are better co-ordinated, there is a fresh impetus for change which can only benefit the industry.

The trends in this report reveal where nutrient management is on track and signal where extra effort is needed to correct anomalies.

Howard Clark,
Chairman, Fertiliser sector

Figure 1
Trends in overall nutrient application rates in England & Wales.



Source: British Survey of Fertiliser Practice

The changes over the past 35 years in the overall application rates of the major nutrients nitrogen (N), phosphate (P_2O_5) and potash (K_2O) to all crops and grass in England and Wales is shown in Figure 1. From the end of WWII until the mid-1980s application rates of all three nutrients increased significantly, responding to improvements in agronomic knowledge and the yield potentials of new crop and grass varieties. From then until about 2010 overall rates generally declined for several reasons including improving manure use, changes in ruminant stock numbers, plateauing of yields and economic pressure. However, as the chart shows, the rate of nitrogen application was maintained on arable crops, being closely related to the achievement of optimum economic yields, whereas the N rate on grassland fell due in part to reduced stock numbers and an increasing demand for purchased feeds for higher-yielding dairy cows. Since 2010 it appears that application rates of all three nutrients have remained relatively constant; this seems to apply to both arable and grassland sectors.

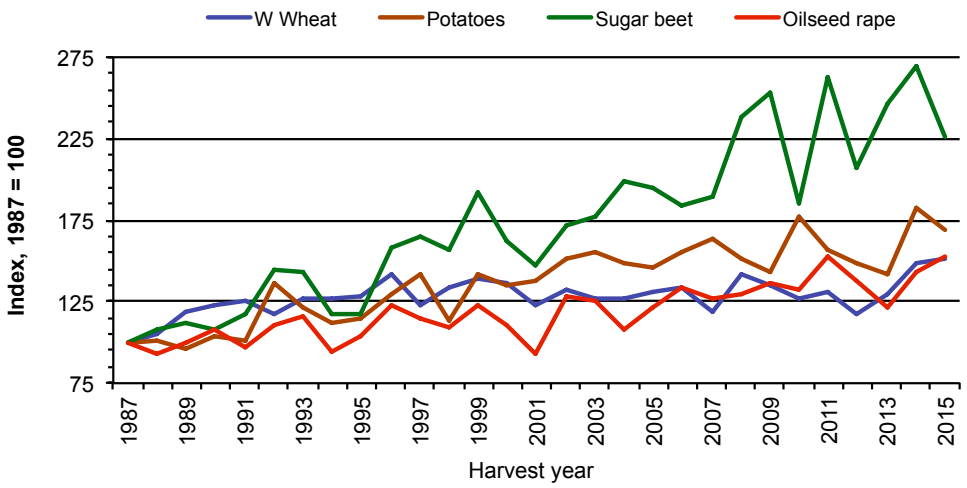
Table 1:
Areas of main crop and managed grass in the UK ('000ha)

Growing season:	2010/11	2011/12	2012/13	2013/14	2014/15	1 year % change 2014-15	5 year % change 2011-15	crop area as % of total 2014-15
Wheat	1969	1992	1615	1936	1832	- 5.4	- 7.0	15.4
Barley	970	1002	1213	1080	1101	+ 1.9	+ 13.5	9.2
Total cereals	**3075**	**3142**	**3028**	**3179**	**3064**	**- 3.6**	**- 0.4**	**25.7**
Potatoes	146	149	139	141	129	- 8.5	- 11.6	1.1
Sugar beet	113	120	117	116	90	- 22.4	- 20.4	0.8
Oilseeds (inc. linseed)	742	785	750	690	667	- 3.3	- 10.1	5.6
Peas/beans (dry)	155	120	147	139	195	+ 40.3	+ 25.8	1.6
Other crops (excl. grass)	443	432	484	457	534	+ 16.8	+ 20.5	4.5
Grass, < 5 yrs old	1278	1357	1390	1396	1167	+ 16.4	- 8.7	9.8
Grass, 5 yrs old+	5877	5799	5802	5824	6078	+ 4.4	+ 3.4	51.0
Total UK area*	**11829**	**11904**	**11857**	**11942**	**11924**	**+ 0.2**	**+ 0.8**	**100.0**
Uncropped arable land	156	153	255	160	214	+ 33.8	37.2	

** Area of potentially fertilised arable land and managed grass*

Source: Defra Statistics

Figure 2: Index of some arable crop outputs per unit of nitrogen input in England & Wales.



Sources: British Survey of Fertiliser Practice and Defra Statistics.

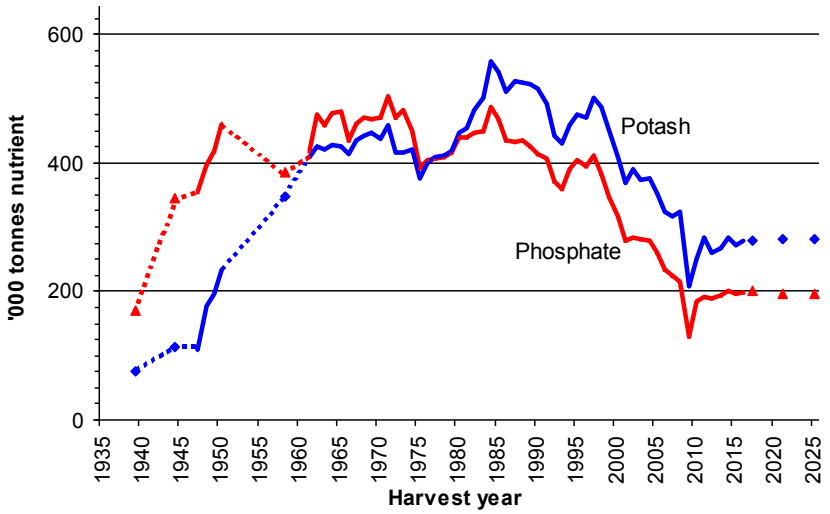
Figure 2 shows continuing improvement in apparent nitrogen use efficiency since the mid-1980s for four major arable crops. Environmental and economic pressure has been applied particularly to nitrogen in recent years leading to significant investment by farmers and the fertiliser industry in new technologies and precision of advice on nitrogen fertiliser use. The results of these on-going improvements on the efficient use of nitrogen explain how the stable nitrogen fertiliser use on arable crops shown in Figure 1 is compatible with the increasing yield trends recorded in national statistics.

Table 2: Overall rates of fertiliser usage, Great Britain

			kg/ha				
			2010/11	2011/12	2012/13	2013/14	2014/15
Arable	**Total Nitrogen**	**N**	**146**	**144**	**137**	**146**	**146**
	Compound N		14	13	16	14	13
	Straight N		132	131	121	132	133
	Total Phosphate	**P_2O_5**	**29**	**28**	**28**	**29**	**29**
	Total Potash	**K_2O**	**39**	**37**	**40**	**39**	**38**
Grass	**Total Nitrogen**	**N**	**57**	**56**	**59**	**60**	**56**
	Compound N		29	31	31	30	28
	Straight N		28	25	28	30	28
	Total Phosphate	**P_2O_5**	**9**	**9**	**9**	**10**	**9**
	Total Potash	**K_2O**	**12**	**12**	**13**	**14**	**12**
Arable & Grass	**Total Nitrogen**	**N**	**99**	**95**	**94**	**99**	**98**
	Compound N		22	23	24	23	21
	Straight N		77	72	70	76	77
	Total Phosphate	**P_2O_5**	**19**	**17**	**18**	**18**	**18**
	Total Potash	**K_2O**	**25**	**23**	**25**	**25**	**24**

Source: British Survey of Fertiliser Practice

Figure 3: Consumption of phosphate and potash in GB, with forecast.



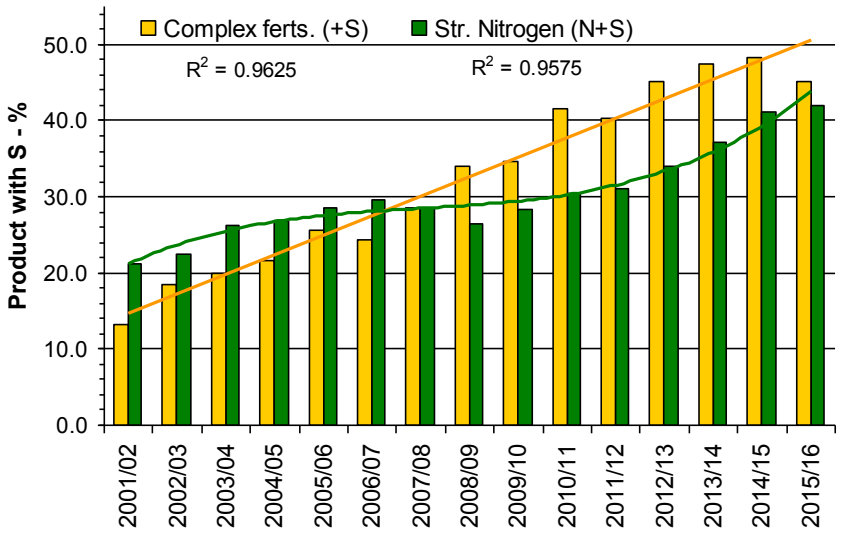
Sources: AIC Statistics and Fertilizers Europe Forecast

The quantities of phosphate (P_2O_5) and potash (K_2O) fertiliser nutrients consumed in the UK over the past 75 years are shown in Figure 3. This data set starts just before the outbreak of WWII, at a time when annual nitrogen (N) fertiliser consumption in the UK was about 60 kt N, with phosphate use at 170 kt P_2O_5 and potash at 75 kt K_2O. Until this time phosphate and potash consumption had been relatively constant. The need for home-grown food from the end of the 1930s stimulated farming and fertiliser use; from that time the growth in agricultural productivity was remarkable and consumption of phosphate and potash grew not just to replace the offtakes at harvest, but to improve soil nutrient status from its relatively low levels before 1940. By the mid-1980s soil indices were generally satisfactory and economic pressure together with little obvious crop response to these inputs and improving use of farm manures led to declining use on both arable and grassland. However, since about 2010 this decline has ceased as offtakes, inputs and manure recycling have come nearer to approximate balance; current levels of consumption are forecast to continue.

Table 3: UK consumptions of fertiliser nutrients ('000 tonnes)

Growing season:	2004/05 10 yrs ago	2010/11	2011/12	2012/13	2013/14	2014/15	1 year % change 2014-15	10 year % change 2003-15
Nitrogen (N)	1061	1022	1000	998	1060	1049	- 1.0	- 1.1
Phosphate (P_2O_5)	259	192	188	194	201	196	- 2.5	- 24.3
Potash (K_2O)	352	283	259	267	284	272	- 4.2	- 22.7
Total Plant Food	**1672**	**1497**	**1447**	**1459**	**1545**	**1517**	**- 1.8**	**- 9.3**

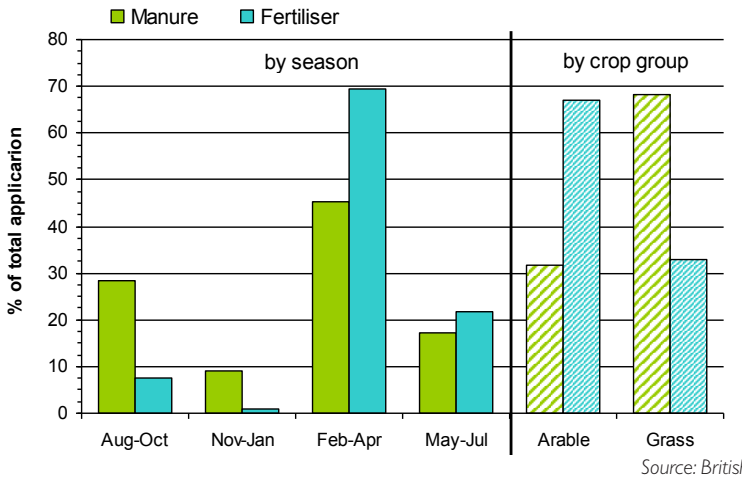
Figure 4: Proportions of complex and straight nitrogen fertilisers containing sulphur in the UK.



Source: AIC Statistics

The proportions of fertilisers which include sulphur has been increasing steadily since the deficiency of this nutrient became apparent. From the beginning of the industrial revolution, and almost 100 years before there was significant use of fertiliser nitrogen, anthropogenic emissions provided far more sulphur than was needed for protein synthesis. However, emissions of sulphur are now so low that fertiliser sulphur is an essential input to help maximise the efficient use of nitrogen by crops. Sulphur deficiency adversely affects both yield and quality of crops and also the nutritional value of grass and other ruminant feeds.

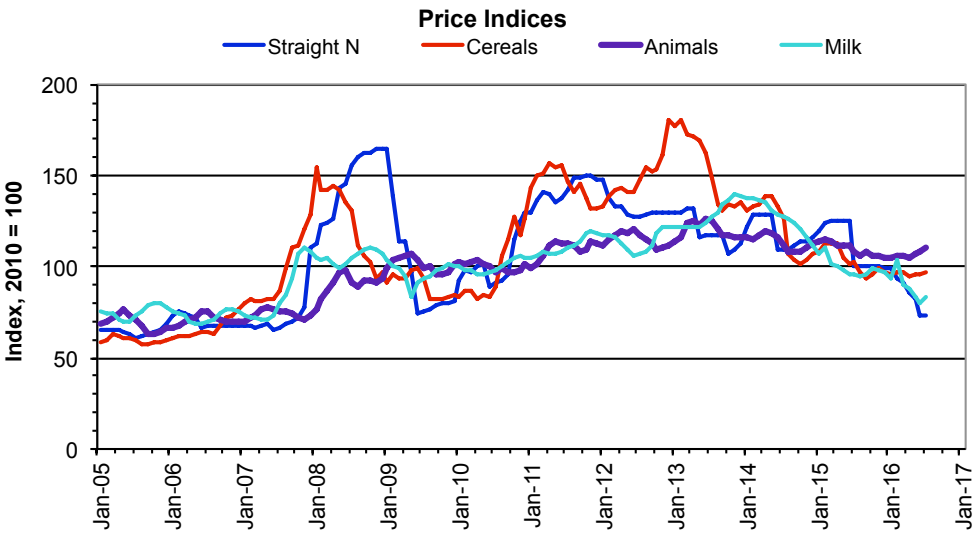
Figure 5: Timing of application of manures and fertilisers and relative proportions used on arable and grassland in the UK.



Source: British Survey of Fertiliser Practice

Figure 5 shows the different seasonal timing of applications of manures and fertilisers in the UK. For logistical reasons almost 40% of manures are applied in the autumn or winter, despite this being less than ideal for maximum nitrogen use efficiency. Less than 9% of mineral fertilisers is applied during this 6-month period and this is effectively all phosphate and potash, with less than 1% of fertiliser being applied as nitrogen. 91% of all mineral fertiliser is applied between February and July, with 88% of all fertiliser nitrogen being applied in the three months of March to May, the main growing season. Clearly the largest quantity of animal manure is generated on grassland farms, and about two thirds of all manures are applied to grassland. The remaining third, including most of the pig and poultry manure, is spread on arable land. In contrast only one third of mineral fertilisers is applied to grassland, with two thirds to arable crops.

Figure 6: Relative changes in the price of straight nitrogen and some farm outputs since 2005.



Source: Defra Statistics

Monthly changes in the index of prices for nitrogen fertiliser and some farm outputs are shown in Figure 6, where 100 represents the values during 2010. Influencing factors, such as the weather, energy price, regional economics and policy affect prices. Fertiliser nitrogen and cereal prices are subject to the influence of global demand more than the price of milk or animals for meat. The prices of these latter two commodities are influenced more locally and show less volatility over the period.

This summary uses Government data on land use, statistics and The British Survey of Fertiliser Practice (BSFP). The Survey, funded jointly by Defra and the Scottish Government, is an independent annual report of fertiliser application rates providing data for farmers and environmentalists, regulators and the industry. It also provides information on lime use and organic manure application.

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