Fertiliser Statistics2012

REPORT

For many years, policy makers only viewed fertilisers in the context of environmental concerns while industry representatives maintained that optimal and appropriate use of fertilisers should remain on the agenda. Today, we see a more balanced view returning.

Professor Sir John Beddington is keen that the UK Government Office for Science leads the debate for the future, in which he calls for a renewed appreciation of the role of fertilisers in sustainable agricultural systems across the globe. This is welcome news for an industry that contributes so much to the challenge of feeding the world.

Long term statistical trends are essential in informing this debate; knowing where balances and imbalances lie and what needs to be done to meet both food demands and to address environmental challenges. The UK is leading in this regard, with the British Survey of Fertiliser Practice providing high quality data unmatched by any other country. This AIC Report summarises some main trends and answers which this survey provides.

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

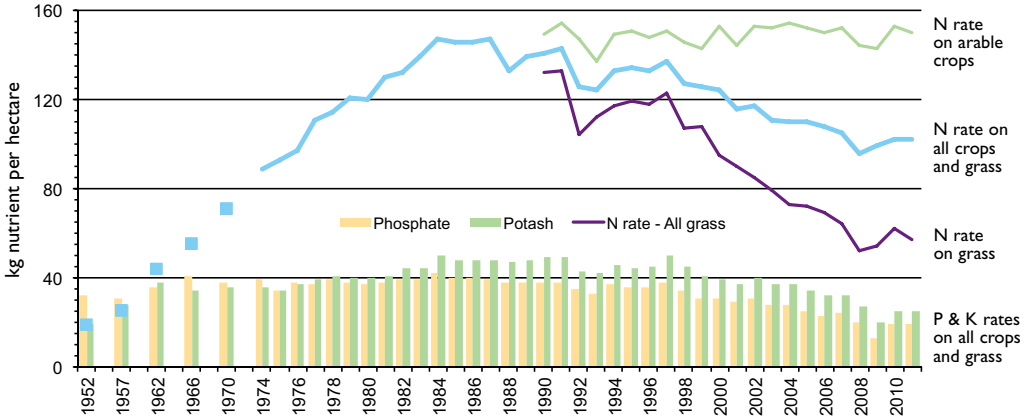
Growing season:	2006/07 5-yrs ago	2007/08	2008/09	2009/10	**2010/11**	1 year % change 2010-11	5 year % change 2007-11	crop area as % of total 2010/11
Wheat	1830	2080	1775	1939	**1969**	+ 1.5	+ 7.6	16.6
Barley	898	1032	1143	921	**970**	+ 5.3	+ 8.0	8.2
Total cereals	2885	3274	3076	3013	**3075**	+ 2.1	+ 6.6	26.0
Potatoes	140	144	144	138	**146**	+ 5.8	+ 4.3	1.2
Sugar beet	125	120	114	118	**113**	- 4.2	- 9.6	1.0
Oilseeds (inc. linseed)	687	621	600	686	**742**	+ 8.2	+ 8.0	6.3
Peas/beans (dry)	161	148	228	210	**155**	- 26.2	- 3.7	1.3
Other crops (excl. grass)	442	428	445	445	**443**	- 0.4	+ 0.2	3.7
Grass, < 5 yrs old	1176	1141	1241	1232	**1278**	+ 3.7	+ 8.7	10.8
Grass, 5 yrs old+	5965	6036	5865	5925	**5877**	- 0.8	- 1.5	49.7
Total UK area*	**11581**	**11912**	**11713**	**11767**	**11829**	**+ 0.5**	**+ 2.1**	**100.0**
Uncropped arable land	599	194	244	174	**156**	- 10.3	- 74.0	

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

Source: Defra Statistics

Figure 1: Changes in overall fertiliser nutrient application rates, England and Wales

Figure 1 shows the overall application rates of nutrients to all crops and grass in England and Wales. The chart shows rates of application per hectare whereas Table 3 shows the overall consumption in tonnes of nutrients, but for the UK. Figure 1 illustrates the decline in the overall rates of nitrogen (N), phosphate (P_2O_5) and potash (K_2O) which has taken place since the early 1990s. While the rate of use of P_2O_5 and K_2O has declined on much arable land – notably cereals, oilseeds and pulses – as well as on grassland, the same is not the case for nitrogen. Almost all the decline in rate of N use has been on grassland matching the reductions in rates of P_2O_5 and K_2O, while the N rate on arable crops has been maintained.

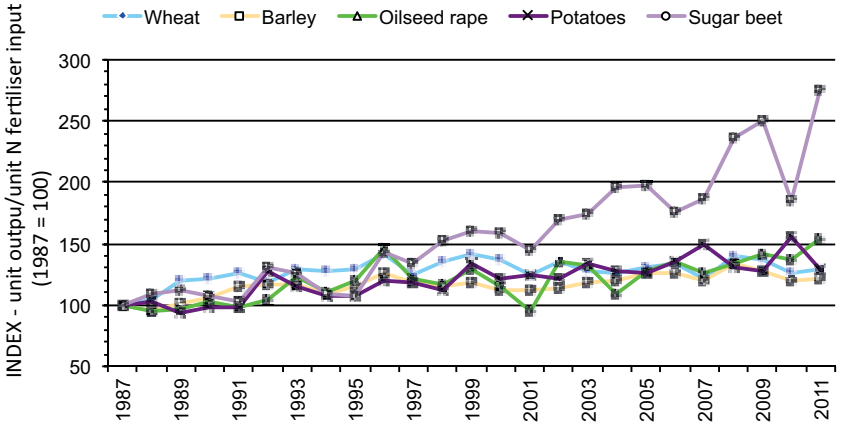


Source: British Survey of Fertiliser Practice

The application rates, particularly for P_2O_5 and K_2O, fell significantly as a result of the spike in prices, although much of that reduction had recovered by 2010. The apparent dip in N application rates recovered fully by 2010 in the arable sector, and returned to trend on grassland.

Figure 2: Changes in the apparent efficiency in the use of fertiliser nitrogen, England & Wales

This chart illustrates the apparent relative efficiency with which a number of arable crops are calculated to use the nitrogen fertiliser applied. There is a generally improving performance, although the effect of the relatively low grain yields from the 2007 and recent harvests is apparent. The trend towards specialisation by fewer producers growing sugar beet appears to result in improving nitrogen use efficiencies.



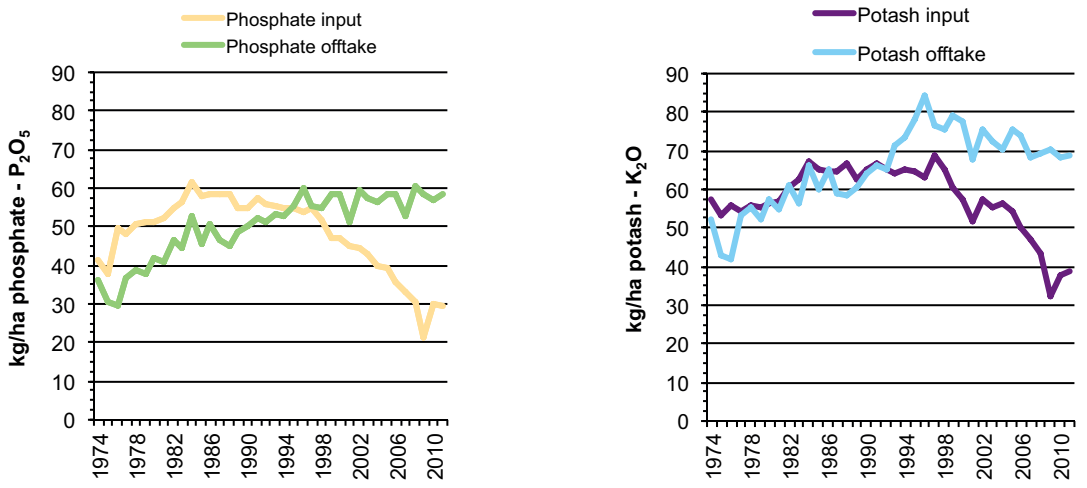
Source: British Survey of Fertiliser Practice and Defra statistics

Table 2: Overall rates of fertiliser usage, Great Britain

			kg/ha				
			2006/07	2007/08	2008/09	2009/10	2010/11
Arable	**Total Nitrogen**		**148**	**144**	**139**	**149**	**150**
	Compound N	N	15	16	14	14	14
	Straight N		133	128	125	135	136
	Total Phosphate	P_2O_5	**34**	**31**	**23**	**30**	**30**
	Total Potash	K_2O	**47**	**43**	**33**	**38**	**39**
Grass	**Total Nitrogen**		**65**	**55**	**57**	**63**	**57**
	Compound N	N	39	32	29	33	29
	Straight N		26	23	28	30	28
	Total Phosphate	P_2O_5	**14**	**10**	**9**	**10**	**9**
	Total Potash	K_2O	**18**	**13**	**12**	**14**	**12**
Arable & Grass	**Total Nitrogen**		**105**	**96**	**97**	**102**	**101**
	Compound N	N	28	24	22	24	22
	Straight N		77	72	75	78	79
	Total Phosphate	P_2O_5	**24**	**20**	**15**	**19**	**19**
	Total Potash	K_2O	**32**	**27**	**22**	**25**	**25**

Source: British Survey of Fertiliser Practice

Figure 3: Phosphate and potash fertiliser inputs and offtakes for major arable crops in England & Wales



Source: British Survey of Fertiliser Practice and Defra statistics

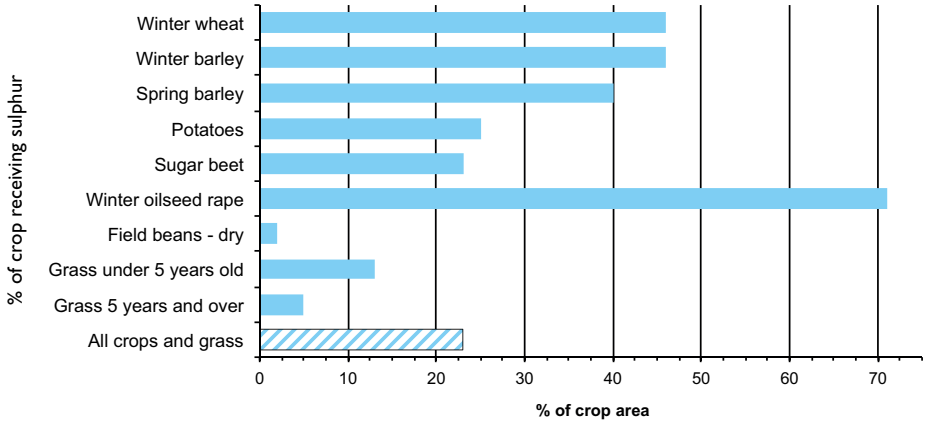
The imbalance between inputs and offtakes of fertiliser phosphate and potash on arable farms in England & Wales continues to grow. While the values shown in the two charts do not take account of manure inputs, the recent conspicuous divergence between inputs and offtakes is not a sustainable trend. It is likely that the reduction in inputs is in response to economic pressure, but with reference to Figure 1 it can be seen that the average application rates for both phosphate and potash to arable land are lower now than in the mid-1950s, when wheat yields were about 3 t/ha. Reduced soil fertility, due to a deficiency of phosphate or potash, will result in reduced efficiency in the use of nitrogen by these crops.

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

Growing season:	2000/01 10 yrs ago	2006/07	2007/08	2008/09	**2009/10**	**2010/11**	1 year % change 2010-11	10 year % change 2001-11
Nitrogen (N)	1162	1008	1006	913	**1016**	**1022**	+ 0.6	- 12.0
Phosphate (P_2O_5)	279	224	215	129	**184**	**192**	+ 4.3	- 31.2
Potash (K_2O)	369	317	325	208	**251**	**283**	+ 12.7	- 23.3
Total Plant Food	1810	1549	1546	1250	**1451**	**1497**	+ 3.2	- 17.3

Source: AIC Statistics

Figure 4: Percentage of crop areas in GB receiving fertiliser sulphur in 2011

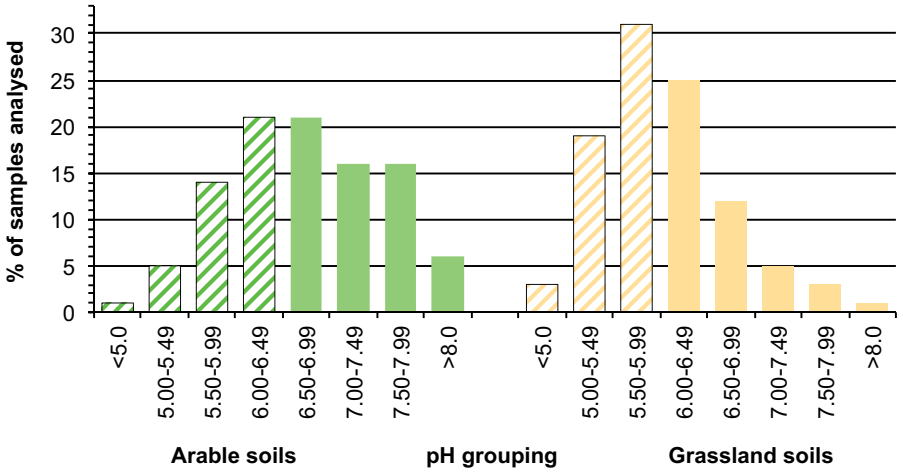


Source: British Survey of Fertiliser Practice

The proportion of field crops and grassland which receive a dressing of fertiliser sulphur is much lower than would be expected, given that so little sulphur is deposited from the atmosphere in Britain today. Efficient use of nitrogen requires a balanced availability of all necessary plant nutrients, and if the supply of one or more is inadequate then a proportion of the applied nitrogen is likely to be wasted. The dressing covers on the cereal and oilseed rape areas shown in Figure 4 are very similar to the 5-year averages for these crops. Despite the cover being relatively low there is no indication that it is increasing year-on-year as would be expected. Considering that sulphur is an essential constituent of protein it is surprising to see virtually none being applied to field beans.

The proportion of grassland receiving sulphur is also low, potentially threatening the N:S ratio in ruminant diets necessary to optimise feed utilisation. The application of sulphur to only 13% of productive young grass has remained constant for many seasons.

Figure 5: Distribution of pH status of arable and grassland soils sampled, 2011/12

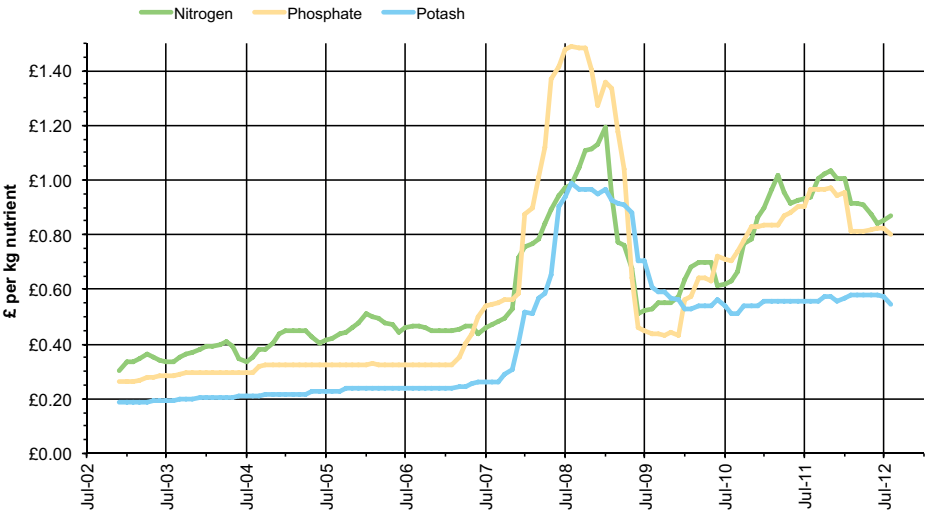


Source: PAAG Report

The analysis of soil samples to determine their acidity (pH) and the level of available reserve of the plant nutrients phosphorus, potassium and magnesium is standard practice on most arable and many grassland farms in the UK. In recent years members of the Professional Agricultural Analysis Group (PAAG) have produced an annual anonymised report of the results of analyses of some 170,000 soil samples. It has been estimated that these samples, if taken from the same fields about every five years, represent maybe 7 million hectares of UK farmed land.

Using lime to correct soil acidity has been standard practice for centuries, and it is surprising to find that almost 20% of the samples known to be from arable soils had a pH below 6.0, and over 40% were below the usually recommended pH 6.5. The results from the samples known to relate to grassland showed that over 20% were below pH 5.5 and more than 50% were below the usually recommended pH 6.0. Good agricultural practice and efficient nutrient management require that soils are not allowed to become overly acidic and these results suggest that many UK soils are under-limed.

Figure 6: 10-year average UK on-farm prices of fertiliser nutrients - nitrogen (N), phosphate (P_2O_5) and potash (K_2O)



From Figure 6 it can be seen that until 2007 prices of fertiliser nutrients changed relatively slowly. In 2007/08 a number of global factors came together to cause a major disruption in the markets for all three major nutrients, with demand outstripping supply, which resulted in unprecedented global price spikes. These price rises were anticipated by some, and much product was bought in the early stages, with relatively little being purchased at the top of the spike. The resulting reduction in the usage of phosphate and potash which can be seen in Figure 1 was repeated throughout much of the world, causing some rebalancing of supply and demand and allowing prices to fall during 2009. However the global strong demand for oil and the currently inadequate supply bases for phosphate and potash has meant that the post-spike prices are higher than historically. Furthermore the global population continues to grow, putting pressure on food supplies and thus on fertiliser demand. There is currently significant investment in new production capacity worldwide, but the outlook is for fertiliser prices to remain above pre-2008 levels.

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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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