FertiliserStatistics2015

For many years, the fertiliser industry has been committed to helping British farmers to improve nutrient use efficiency for both business profitability and to address environmental concerns. However, it is not widely appreciated that the actual proportions of fertilisers used in the context of the national nutrient cycle differ considerably from what might be expected.

Only about half of all nitrogen applied to productive land is from nitrogen-based mineral fertilisers. The rest results from organic sources, mainly livestock manures but also recycled materials from the water and other industries. In the grassland sector, fertiliser nitrogen only contributes to 35% of the total nitrogen applied and just 17% of phosphate applied to grass, is from a bag. In the arable sector, these figures are 72% and 41% respectively.

These facts, along with those in this review and a greater focus on the required soil pH, sulphur and potassium balances, help the industry to recognise the issues that lie ahead and to emphasise to policy-makers where the additional scope for improving nutrient use efficiency lies. The fertiliser industry already invests significantly in advice and technology, however, future business and environmental targets will only be delivered with a plan of action for organic manures.

Roger Brogden, Chairman, AIC Fertiliser Sector

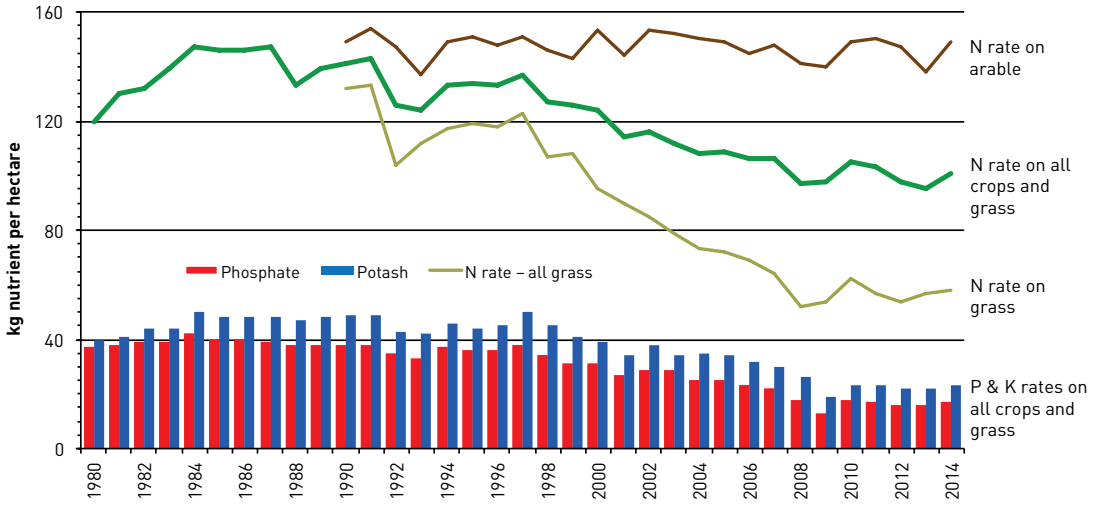
Table 1: Areas of main crop and managed grass in the UK ('000ha)

Growing season:	2009/10 5-yrs ago	2010/11	2011/12	2012/13	2013/14	1 year % change 2013-14	5 year % change 2010-14	crop area as % of total 2013/14
Wheat	1939	1969	1992	1615	1936	+ 19.9	- 0.2	16.2
Barley	921	970	1002	1213	1080	- 11.0	+ 17.3	9.0
Total cereals	**3013**	**3075**	**3142**	**3028**	**3179**	**+ 5.0**	**+ 5.5**	**26.6**
Potatoes	138	146	149	139	141	+ 1.4	+ 2.2	1.2
Sugar beet	118	113	120	117	116	- 0.9	- 1.7	1.0
Oilseeds (inc. linseed)	686	742	785	750	690	- 8.0	+ 0.6	5.8
Peas/beans (dry)	210	155	120	147	139	- 5.4	- 33.8	1.2
Other crops (excl. grass)	445	443	432	484	457	- 5.6	+ 2.7	3.8
Grass, < 5 yrs old	1232	1278	1357	1390	1396	+ 0.4	+ 13.3	11.7
Grass, 5 yrs old+	5925	5877	5799	5802	5824	+ 0.4	- 1.7	48.8
Total UK area*	**11767**	**11829**	**11904**	**11857**	**11942**	**+ 0.7**	**+ 1.5**	**100.0**
Uncropped arable land	174	156	153	255	160	- 37.3	- 8.0	

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

Source: Defra Statistics

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

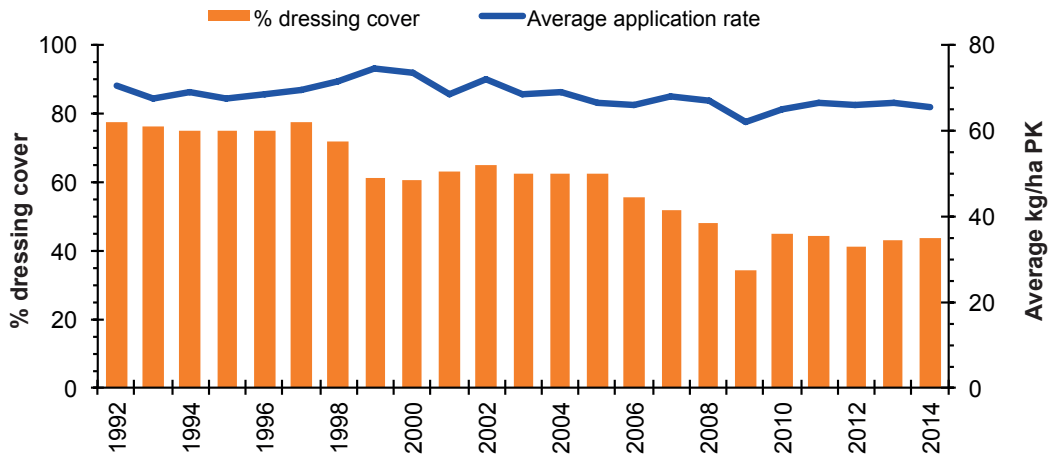


Source: British Survey of Fertiliser Practice

Figure 1 shows the overall application rates of nutrients to all crops and grass in England and Wales, for which a long-term dataset exists. This figure shows the application rates per hectare and illustrates the decline in overall rates of nitrogen (N), phosphate (P_2O_5) and potash (K_2O) since the early 1990s. (See also Table 3, which shows the overall recent consumption in tonnes of nutrients, but for the United Kingdom.) While the rate of use of P_2O_5 and K_2O has declined on much arable land – notably combinable cereals, oilseeds and pulses – as well as on grassland, the same is not true for nitrogen. Almost all the decline in rate of use of N has been on grassland, whereas the N rate on arable crops has been maintained. However, the chart suggests that the reduction in the nitrogen rate on grassland may have ceased, with annual application rates now appearing more consistent at 55-60kg N/ha.

Phosphate and potash application rates have fallen since their peak use in the 1990s, with rates of use declining on grassland in line with the reduced fertiliser nitrogen use. However, application rates have also declined significantly on arable land, despite nitrogen application rate having remained constant. These latest data on the rates of use of phosphate and potash appear to confirm that the decline in use may now have stabilised, although application rates of both phosphate and potash are now lower than they were 60 years ago.

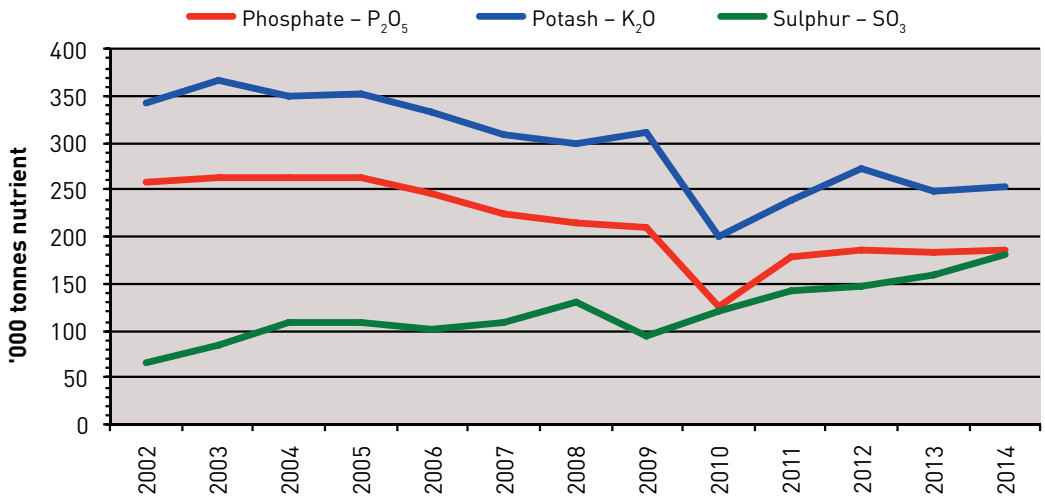
Figure 2: Average rate of phosphate and potash applied to winter wheat and oilseed rape in GB and the % dressing cover



Source: British Survey of Fertiliser Practice

As noted from Figure 1, the overall application rates of phosphate and potash on combinable crops such as winter wheat and oilseed rape have declined significantly since the mid-1990s. However, Figure 2 shows that this overall decline has been associated with a reduction in the dressing cover (percentage of the crop receiving a dressing) rather than a decline in the average application rate where phosphate and potash is applied. The data shown in Figure 2 suggest that the percent dressing cover may no longer be in decline. However, it is concerning to note that on average only about 17% of these crops receive a dressing of manure, meaning that even if manure is applied only where mineral fertiliser is not, the total area of these crops receiving an annual input of phosphate and potash from either source is only about 60%. It is clearly unsustainable to continue to expect good yields and high nitrogen use efficiencies where only 60% of a crop area receives inputs of these essential macronutrients to replace annual removals at harvest, the more so because the total winter wheat and oilseed rape area accounts for 55% of the cropped arable land in Great Britain.

Figure 3: Quantities of phosphate, potash and sulphur consumed in GB



Source: AIC Statistics

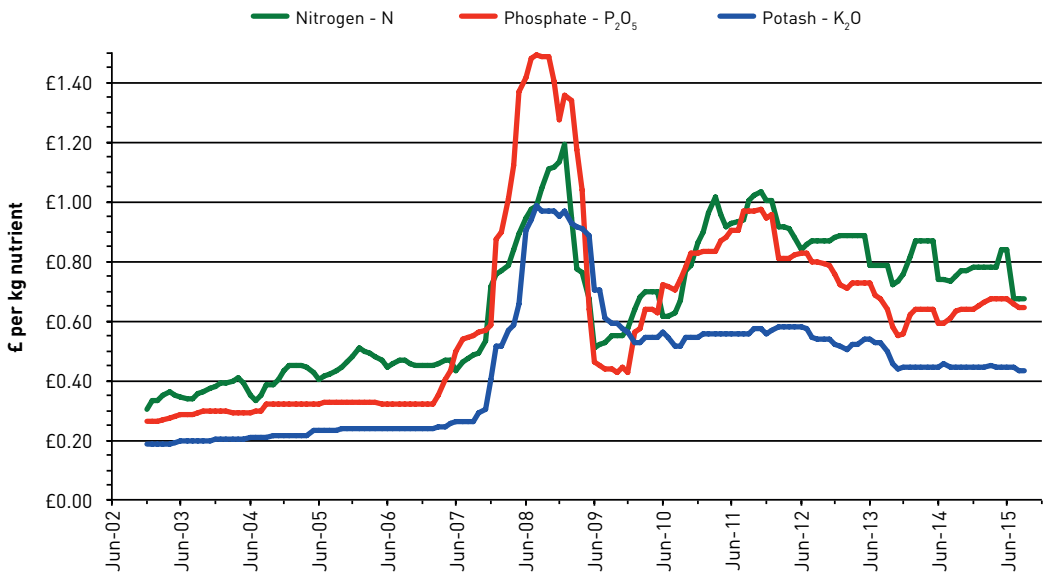
Consumption and use of sulphur has been recorded in AIC Statistics and by the British Survey of Fertiliser Practice for many years. This requirement for fertiliser sulphate has arisen as a result of the environmental success in reducing anthropogenic emissions of sulphur dioxide; sulphur is an essential nutrient for plants and animals but it is no longer freely available from atmospheric deposition. Figure 3 shows the effective year-on-year increase in the quantity of sulphur used on agricultural land in Great Britain to the point where it now matches the consumption of phosphate. As with phosphate and potash, the rate of application where sulphur is applied is in line with recommendations, but the dressing cover for sulphur is similarly low, at only about 50% for most arable crops, with the exception of the high sulphur-demanding oilseed rape crop which now has a cover approaching 80%. Sulphur application cover on grassland, although increasing, is still relatively low, despite the known need for sulphur as a constituent of protein and its role in ensuring grass and silage quality.

Table 2: Overall rates of fertiliser usage, Great Britain

			kg/ha				
			2009/10	2010/11	2011/12	2012/13	2013/14
Arable	**Total Nitrogen**	**N**	**145**	**146**	**144**	**137**	**146**
	Compound N		14	14	13	16	14
	Straight N		131	132	131	121	132
	Total Phosphate	**P_2O_5**	**30**	**29**	**28**	**28**	**29**
	Total Potash	**K_2O**	**38**	**39**	**37**	**40**	**39**
Grass	**Total Nitrogen**	**N**	**63**	**57**	**56**	**59**	**60**
	Compound N		33	29	31	31	30
	Straight N		30	28	25	28	30
	Total Phosphate	**P_2O_5**	**10**	**9**	**9**	**9**	**10**
	Total Potash	**K_2O**	**14**	**12**	**12**	**13**	**14**
Arable & Grass	**Total Nitrogen**	**N**	**101**	**99**	**95**	**94**	**99**
	Compound N		24	22	23	24	23
	Straight N		77	77	72	70	76
	Total Phosphate	**P_2O_5**	**19**	**19**	**17**	**18**	**18**
	Total Potash	**K_2O**	**25**	**25**	**23**	**25**	**25**

Source: British Survey of Fertiliser Practice

Figure 4: Recent trends in fertiliser prices in the UK



Sources: Trade data

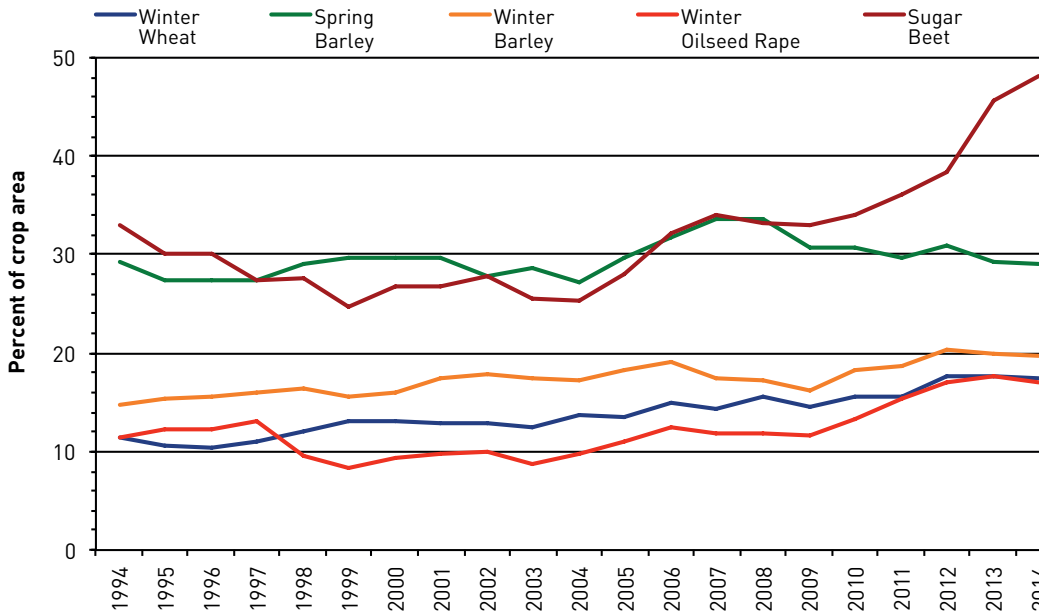
The price of fertiliser nutrients continues to fluctuate more than was the case historically, as is shown in Figure 4. Virtually no fertiliser nitrogen is applied to the land in Great Britain during the 6-month period from September to February but then 85% of the total annual input is applied in the three months March, April and May. However nitrogen fertiliser producers need to run their plants throughout the year and prices are varied within season to ensure that there are orders outside the period of use. Nitrogen prices can be more affected by local (European) circumstance, such as weather, crop yields and prices, biofuel incentives, etc, whereas phosphate and potash prices tend to be more global, being related to major purchasing by governments and other large buyers in the Indian sub-continent, China and South America.

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

Growing season:	2003/04 10 yrs ago	2009/10	2010/11	2011/12	2012/13	2013/14	1 year % change 2013-14	10 year % change 2004-14
Nitrogen (N)	1125	1016	1022	1000	998	1060	+ 6.2	- 5.8
Phosphate (P_2O_5)	278	184	192	188	194	201	+ 3.6	- 27.7
Potash (K_2O)	375	251	283	259	267	284	+ 6.4	- 24.3
Total Plant Food	**1778**	**1451**	**1497**	**1447**	**1459**	**1545**	**+ 5.9**	**- 13.1**

Source: AIC Statistics

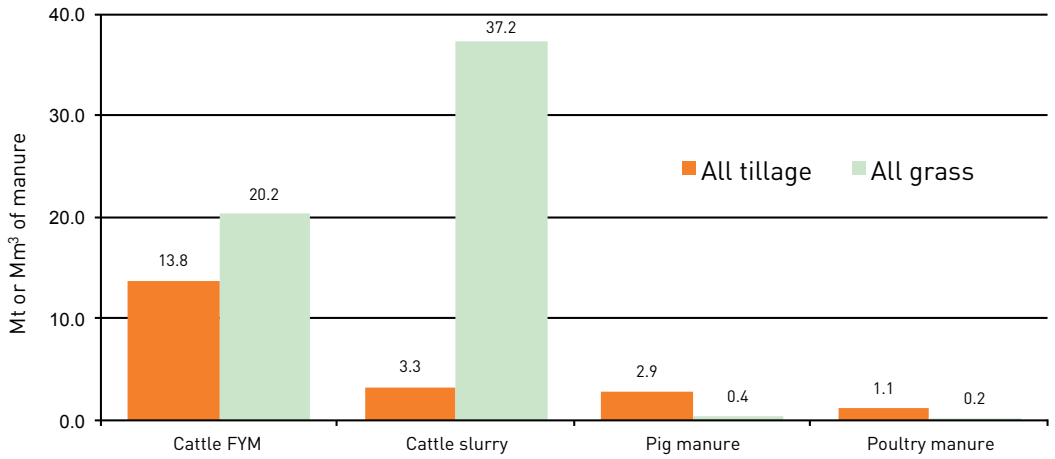
Table 5: Areas of some GB crops receiving a dressing of manure (3-year moving averages)



Source: British Survey of Fertiliser Practice

Figure 5 illustrates a steady increase in the area of winter-sown crops which receive a dressing of manure; this is an indication of continuing integration of the use of manures with that of mineral fertilisers, resulting in improved nutrient use efficiency. Manure use recorded in the British Survey of Fertiliser Practice (BSFP) includes farm manures, biosolids, composts and other non-farm manures, although cattle manures are by far the dominant products. Winter sown crops provide a shorter window of opportunity for spreading manures, and application to spring-sown crops is more common. Potatoes have traditionally been one of the main recipients of manure dressings; the BSFP reports usage on this crop but excludes fields rented solely for growing potatoes thereby rendering the manure use data less robust. However, data suggest that in recent years the use on potatoes has shown a similar significant increase to that seen on sugar beet, although historically dressing cover on potatoes has been higher than on sugar beet.

Figure 6: 5-year averages for the main GB farm manures applied to tillage and grassland



Source: British Survey of Fertiliser Practice

Cattle, pig and poultry manures account for 93% of all manures applied on farm in Great Britain, including biosolids and composts etc. Furthermore, cattle farmyard manure (FYM) and slurry together make up 94% of all cattle, pig and poultry manures. Figure 6 shows the quantity of each manure that is applied to arable land or to grassland. Almost all cattle slurry (92%) is applied to grassland, whereas cattle FYM is applied to both tillage and grass. This tillage area includes crops grown for forage or fodder on livestock farms, with 85-90% of the maize area and about 50% of other animal feed crops receiving manure. On average only 23% of the total tillage area (predominantly cereals and oilseed rape) is dressed with manure. Quantified information on the use of manures is a key management requirement for integrating these manure inputs with appropriate mineral fertilisation to satisfy the nutritional needs of crops and grass in the UK.

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.

AIC, Confederation House,
East of England Showground,
Peterborough PE2 6XE
T: 01733 385230 F: 01733 385270
www.agindustries.org.uk

10790