Annex 4. Telephone survey

Executive Summary

1. Introduction

Defra commissioned ADAS to undertake a project to estimate the extent to which GHG emissions associated with N fertiliser use on arable crops in England could be reduced through optimal N timing, improving the prediction of N requirement and the development of longer-term technologies. This was to be achieved through the following objectives;

1. Estimate the potential to increase yield and reduce GHG emissions through altering N timing and assess whether this is influenced by factors such as region.
2. Estimate the level of imprecision in N fertiliser use and the effect on GHG emissions.
3. Evaluate the scope for altering N timing towards the optimum for minimising GHGs, identify barriers for change and assess whether these are influenced by factors such as region.
4. Evaluate the scope for minimising imprecision of fertiliser use and identify barriers for change.
5. Assess the potential for minimising fertiliser N requirement through the development of N efficient varieties and low N bread technology.
6. Estimate realistic changes to N use and GHG emissions that could be achieved with timescales.

A market research study was conducted in order to help achieve objectives 1-4. This report contains the findings of this study.

2. Method

The market research study was conducted in two stages. Firstly 300 telephone interviews were conducted amongst a representative sample of cereal, general cropping and mixed farms. Each interview lasted approximately 10 minutes and was conducted by a specialist interviewing agency, the Hill Taylor Partnership, using CATI technology (computer assisted telephone interviewing). The aim of the interviews was to understand current farm practice and decision making with regard to nitrogen fertiliser application and to assess likelihood to make changes to improve precision and timing of application. The second stage involved 4 focus groups, one with agronomists and 3 with farmers. Each session lasted 1.5 to 2 hours and comprised 7-8 respondents. The aims were to explore in more detail the potential to change farm practice in order to reduce greenhouse gas emissions from N fertiliser application, and to understand barriers to change and how these could be overcome. The focus groups are reported in detail in Annex 5.

3. Telephone survey findings

3.1 Application practice

79% of the sample applied nitrogen fertiliser to winter feed wheat, 56% to winter oilseed rape, 49% to winter barley, 38% to spring barley and 34% to winter bread wheat. Winter barley was most common on mixed farms (64%), whilst winter bread wheat (45%) and oilseed rape (70%) were most common on cereal farms. Farmers were currently applying nitrogen fertiliser in between 1 and 4 splits. 3-4 splits were

most often used for winter bread wheat, compared to 2-3 for winter feed wheat and winter oilseed rape. 2 splits were most often used for winter barley, whilst 1-2 were used for spring barley.

The farmer was the main person to apply the nitrogen fertiliser on 88% of farms, with 11% using a contractor.

Nitrogen fertiliser was most often applied in solid form on 88% of farms; liquid fertiliser was more often the main form used on cereal farms (18%) than elsewhere.

Single or twin disc spreaders were predominantly used to spread the fertiliser (78%). 9% used a sprayer, 6% an oscillating spout and 2% a pneumatic spreader. The single or twin disc spreader was most commonly used on large farms, whilst a sprayer was more likely to be used on cereal farms than the other farm types.

91% of the farms had had their fertiliser spreader calibrated either within the last year or about a year ago. Mixed farms were the least likely to do so (66%).

3.2 Decision making - precision of application

Both the agronomist and farmer played a key role in deciding how much nitrogen fertiliser to apply (agronomist decided alone 21%, farmer alone 28%, joint farmer and agronomist 47%).

63% of farmers used RB209, PLANET (55%) or another tool (8%) to decide how much nitrogen to apply; the remainder relied on experience and details of previous years applications. Use of RB209 was lowest on mixed farms 35%. 80% of agronomists were known to use RB209 (69%) or another system (11%).

2/3 of farmers always took the soil N into account when deciding how much nitrogen to apply, whilst 14% did so most of the time; 7% some of the time, 3% rarely and 10% never. Mixed farms were most likely not to take the soil nitrogen into account, 20%. The soil nitrogen was equally likely to be measured (42%) or estimated from look up tables (41%). 16% however did neither suggesting they used their own experience or judgement. The small farms were the most likely to use their own experience or judgement (23%). The main reasons for not measuring the soil nitrogen were a lack of confidence that it would improve the nitrogen prediction (39%) and expense (31%).

Agronomists were more likely than farmers to take the soil nitrogen into account; 88% always, 6% most of the time. The agronomist was also more likely than the farmer to actually measure the soil nitrogen (69%) than use look up tables (21%). A small proportion of agronomists (3%), were not thought to take soil nitrogen into account or estimate or measure its content.

The proportion of farms that applied manure who always took manure nitrogen into account (92%) was higher than the proportion who always took soil nitrogen into account (66%). In addition 3% took manure N into account most of the time. Of the 7% of farms that didn't always take manure nitrogen into account, the majority didn't believe it would make much difference to the amount of nitrogen they would need to apply. However, 29% hadn't thought about it suggesting that increased knowledge amongst these farmers could improve precision. The small and medium sized farms were less likely than the large farms to take the manure nitrogen into account.

Where manure nitrogen was taken into account, this was most often done through nutrient analysis (48%), with a high proportion using look up tables. 15% appeared to take it into account based on their own knowledge as they neither undertook an analysis nor used look up tables.

84% of those who grew oilseed rape always took the crop nitrogen into account when deciding how much nitrogen to apply, whilst a further 4% did so most of the time. These figures were even higher on farms where an agronomist decided how much nitrogen to apply (always: 95%). However, crop nitrogen was never considered on 7% of farms. A lack of time was the main reason for not always taking the crop nitrogen into account, followed by lack of confidence (26%) and cost (22%).

3.3 Decision making – timing of application

The farmer was the main person who decided when to apply the nitrogen fertiliser, either alone (47%) or jointly with an agronomist (36%). On 14% of farms an agronomist made the decision alone, whilst on 3% the contractor made the decision. The agronomist was more likely to make the decision alone on the large farms (21%).

82% of the sample had an idea when the nitrogen fertiliser would be applied well ahead of the application, the farmers who made a joint decision with an agronomist being the most likely to plan ahead (91%). Crop growth stage appeared to be the main driver for when to apply the fertiliser (crop growth stage 54%, time period 8%, both crop growth stage and time period 37%). The time period was more likely to be defined by the weather than a specific date or time period. In fact, 95% of farms indicated that the weather was a main factor in deciding the actual day of application. 68% mentioned that the time period/growth stage as a main influence, whilst 66% mentioned the soil conditions.

3.4 Potential change to farm practice

Adding an extra application of nitrogen fertiliser

71% of farmers were likely (31% very likely) to apply nitrogen in one additional split if it reduced air pollution and reduced the farm's carbon footprint.

The cereal farms were the most likely to be very likely to do so (37%), whilst the mixed farms were the least likely to be very likely (19%). However, the survey data suggests that cereal farms already apply a greater number of splits than mixed farms. Farms growing winter bread wheat were the most likely to add an extra split whilst farms growing spring barley were the least likely. This may in part be linked to the differences by farm type described above.

The key reasons for not being likely to increase the number of splits were lack of time (33%), cost (25%), lack of belief it would affect air pollution (25%) and insufficient days when the weather would be right (22%). The concern over cost could be overcome if the cost of the application was less than the increase in yield.

Avoiding applying fertiliser for 5 days after significant rainfall

78% of the sample would follow advice not to apply nitrogen fertiliser during 5 days after heavy rainfall in order to reduce air pollution (33% would be very likely to do so).

Farms with heavy soil were more likely to avoid application within this time period than farms with other soil types. Farms growing winter bread wheat appeared the most likely to avoid application within 5 days of heavy rain.

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1. Introduction and Objectives

Defra commissioned ADAS to undertake a project to estimate the extent to which GHG emissions associated with N fertiliser use on arable crops in England could be reduced through optimal N timing, improving the prediction of N requirement and the development of longer-term technologies. This was to be achieved through the following objectives;

7. Estimate the potential to increase yield and reduce GHG emissions through altering N timing and assess whether this is influenced by factors such as region.
8. Estimate the level of imprecision in N fertiliser use and the effect on GHG emissions.
9. Evaluate the scope for altering N timing towards the optimum for minimising GHGs, identify barriers for change and assess whether these are influenced by factors such as region.
10. Evaluate the scope for minimising imprecision of fertiliser use and identify barriers for change.
11. Assess the potential for minimising fertiliser N requirement through the development of N efficient varieties and low N bread technology.
12. Estimate realistic changes to N use and GHG emissions that could be achieved with timescales.

In order to help fulfil objectives 1-4 a market research study was conducted amongst farmers and agronomists. This report details the methodology and findings for this study.

2. Method and Sample

The study was conducted in two phases. Firstly a telephone survey amongst farmers and secondly a series of focus groups amongst agronomists and farmers. Findings from the focus groups are reported in detail in Annex 5.

2.1 Telephone Survey

The survey was conducted via telephone interview using CATI (computer assisted telephone interviewing), and administered by experienced telephone interviewers from the Hill Taylor Partnership (a dedicated market research telephone interviewing agency). 301 interviews were conducted in total. Each interview lasted approximately 10 minutes.

The sample was drawn by Defra from the agricultural census data. The sample excluded part-time farms and farms with a gross margin less than zero, in order to exclude the less active farms. This in effect excluded farms with an SLR of less than 1. The sample only comprised cereal, general cropping and mixed farm types to ensure relevance to the study. A sample of 1,800 was drawn from the population of 19,514 full time cereal, general cropping and mixed farms, with a gross margin greater than zero, to reflect the profile of these farms within England by region and SLR bands.

An opt-out mailing was conducted by ADAS prior to the survey to give those not wishing to take part in a telephone survey the opportunity to decline. 229 of the farmers opted out leaving a total available sample of 1571. The survey aimed to interview 300 of these farmers.

Quotas were applied to the interview sample to reflect the proportion of each farm type within the farming population. Interlocking quotas were also applied within farm type to reflect the farming population in terms of region and SLR size bands. The

achieved sample is detailed below and compared to the profile of full time farms within the population with a gross margin of greater than zero.

Table 1: Sample profile

	Target (population profile)	Achieved Interviews
Farm type		
Cereals	51%	51%
General cropping	27%	27%
Mixed	22%	22%
SLR		
Small 1 to 2 SLR	48%	48%
Medium 2 to 3 SLR	21%	22%
Large 3+ SLR	31%	31%
Region		
North East	5%	5%
North West	4%	3%
Yorkshire and Humber	14%	14%
East Midlands	17%	17%
West Midlands	12%	13%
East of England	22%	23%
South East and London	12%	12%
South West	13%	14%

The survey questionnaire is attached within the appendix to this report.

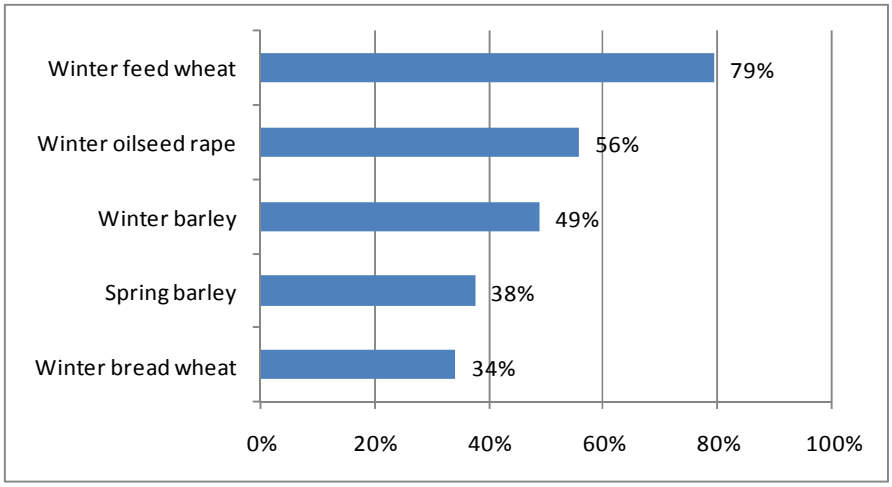
3. Telephone Survey Findings

In order to ensure respondents answered questions about the appropriate type of fertiliser, the following explanation was read out to all respondents at the start of the interview:

The following questions refer to your practice of applying manufactured nitrogen fertiliser. By this I mean nitrogen fertiliser applied either as straight nitrogen fertiliser, for example ammonium nitrate, or as part of a compound, for example ammonium sulphate. The fertiliser can be solid, liquid or foliar. We are only interested in applications of manufactured nitrogen fertilisers so please don't include manures in your answers.

To enable more detailed interrogation of the data, large and very large farm categories have been combined to provide a robust sample base. The regions have been grouped into 4 wider regions, again to provide robust sample bases for analysis. The four regional groups with their respective regions are as follows: North (North East, North West and Yorkshire and Humber); Midlands (East Midlands, West Midlands); South (South East, London, South West) and East of England.

Figure 1: Crops manufactured nitrogen fertiliser is applied to on farm (prompted)



Base: All respondents n=301

Respondents were asked if they applied nitrogen fertiliser to winter bread wheat, winter feed wheat, winter barley, spring barley and oilseed rape. Only respondents who applied N fertiliser to one or more of these crops were considered eligible for interview.

The above chart shows the proportion applying nitrogen fertiliser to each crop. This should be analogous to the proportion growing each crop. The highest proportion of the sample (79%) applied nitrogen fertiliser to winter feed wheat.

Table 2: Crops N fertiliser is applied to by farm type, farm size and region

	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	301	154	80	67	144	65	92
Winter bread wheat	34%	45%**	31%	13%**	25%**	35%	48%**
Winter feed wheat	79%	84%	79%	70%	79%	79%	80%
Winter barley	49%	45%	44%	64%**	44%	51%	55%
Spring barley	38%	32%*	44%	43%	38%	39%	36%
Winter oilseed rape	56%	70%**	48%	33%**	43%**	59%	74%**

	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Winter bread wheat	27%	34%	38%	38%
Winter feed wheat	75%	82%	78%	83%
Winter barley	70%**	40%	40%	49%
Spring barley	46%	32%	36%	39%
Winter oilseed rape	57%	54%	55%	58%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Results by region were broadly similar with the exception of winter barley which appeared to be grown more extensively in the North (70%) than elsewhere.

Differences were evident by farm type in the proportion applying nitrogen fertiliser to the various crop types. Oilseed rape (70%) and winter bread wheat (45%) were significantly more likely to be grown on cereal farms than elsewhere, and least likely to be grown on mixed farms. Winter barley was most commonly grown on mixed farms (64%). The likelihood of growing and applying fertiliser to oilseed rape and winter bread wheat increased the larger the farm.

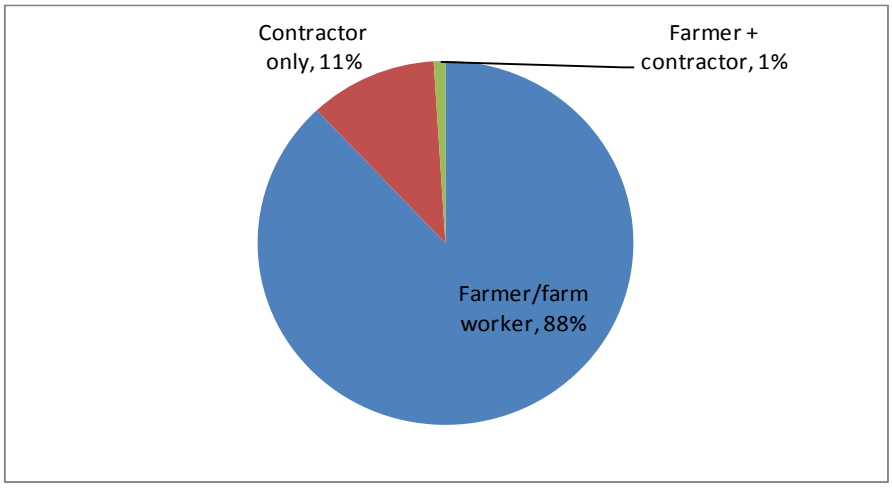
Table 3: Number of times a year manufactured N fertiliser is applied

	Winter bread wheat	Winter feed wheat	Winter barley	Spring barley	Winter oilseed rape
Base	*103*	*239*	*147*	*113*	*168*
5	1%	-	-	-	-
4	23%	3%	1%	-	4%
3	60%	59%	18%	3%	55%
2	14%	34%	67%	49%	35%
1	2%	4%	14%	49%	6%
Average	3.1	2.6	2.0	1.5	2.6

Overall, the greatest number of applications of N fertiliser were made to winter bread wheat (3.1), with 60% making 3 applications. The highest proportion of farmers applied N fertiliser in 3 splits to winter feed wheat and winter oilseed rape, however substantial proportions also applied 2 splits. Winter barley was most commonly applied in 2 splits, whilst similar proportions applied spring barley over 1 or 2 applications. These figures are broadly consistent with data from the BSFP 2006-8.

Given the base sizes it is not possible to identify any consistent differences by farm size, region or farm type, however in the case of winter feed wheat the cereal farms used a greater number of splits than other farms (2.7), whilst the mixed farms used the fewest (average 2.4) (differences significantly different to the remaining sample at the 99% level). Farms in the North applied winter feed wheat in significantly (95% level) fewer splits than elsewhere (average 2.4).

Figure 2: The main person to apply N fertiliser to the crops



Base: All respondents n=301

On the vast majority of farms the farmer or farm worker applied the manufactured nitrogen fertiliser. A contractor was involved in the application on only 12% of farms.

Table 4: Who applies the N fertiliser by farm type, farm size and region

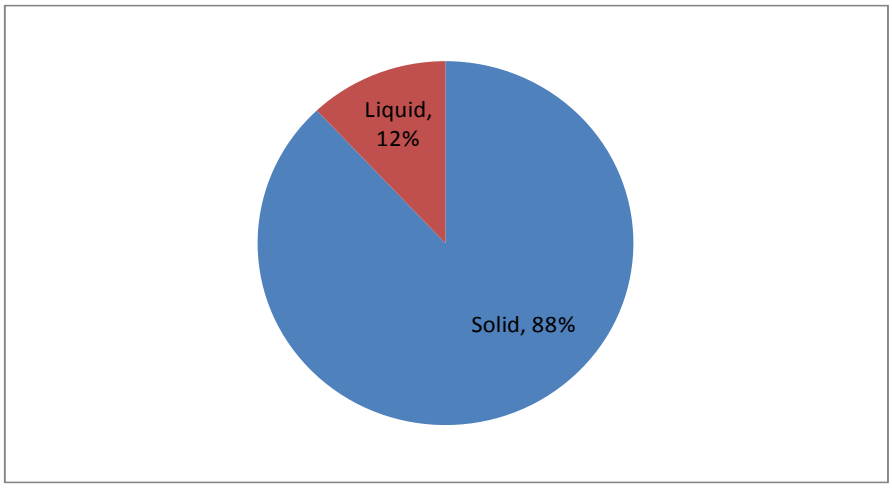
	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Farmer or other farm worker	88%	90%	88%	85%	85%	89%	92%
Contractor only	11%	9%	13%	15%	15%	11%	7%*
Farmer/other farm worker + contractor	1%	1%	-	-	1%	-	1%

	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Farmer or other farm worker	90%	85%	84%	94%*
Contractor only	10%	14%	15%	6%*
Farmer/other farm worker + contractor	-	1%	1%	-

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

The farmer or farm worker was the main person who applied the N fertiliser across all three farm types, size groups and regions. There were no clear differences by farmer type, however the large farms and farms in the East were significantly less likely than the remaining sample to use a contractor to apply the nitrogen fertiliser. Farms in the East were significantly the most likely to apply the fertiliser themselves (94%).

Figure 3: Form in which the N fertiliser was most often applied (prompted)



Base: All respondents n=301

On the majority (88%) of farms, the N fertiliser was most often applied as a solid. It was most often applied as a liquid on 12% of farms. The cereal farms were more likely than the remaining sample to use liquid N fertiliser as the main form (18%).

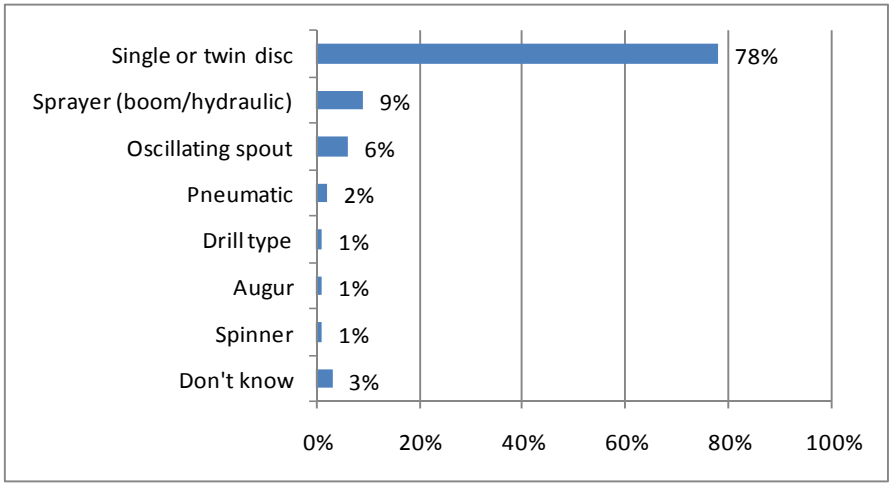
Table 5: Form the N fertiliser was most often applied in by farm type, farm size and region

	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	301	154	80	67	144	65	92
Solid	88%	83%**	94%*	93%	87%	83%	92%
Liquid	12%	18%**	6%*	8%	13%	17%	8%

	North	Midlands	South	East
Base	67	89	76	69
Solid	84%	90%	90%	87%
Liquid	16%	10%	11%	13%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Figure 4: Type of fertiliser spreader usually used (prompted)



Base: All respondents n=301

Over three quarters (78%) of the farms used a single or twin disc spreader, whilst small proportions used a sprayer (9%) or oscillating spout (6%). On 2/3 of farms where the farmer did not know what type of spreader was used, a contractor applied the N fertiliser.

Table 6: Type of fertiliser spreader by farm type, farm size and region

	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Single or twin disc	78%	75%	80%	84%	74%	77%	85%*
Sprayer (boom/hydraulic)	9%	14%**	3%**	5%	8%	11%	8%
Oscillating spout	6%	5%	6%	9%	10%**	5%	-**
Pneumatic	2%	2%	5%	-**	-**	3%	5%
Augur	1%	1%	1%	-	1%	-	-
Spinner	1%	1%	-	-	1%	-	1%
Drill Type	1%	-	1%	2%	1%	-	-
Vacon	-	1%	-	-	1%	-	-
Don't know	3%	3%	4%	2%	3%	5%	1%

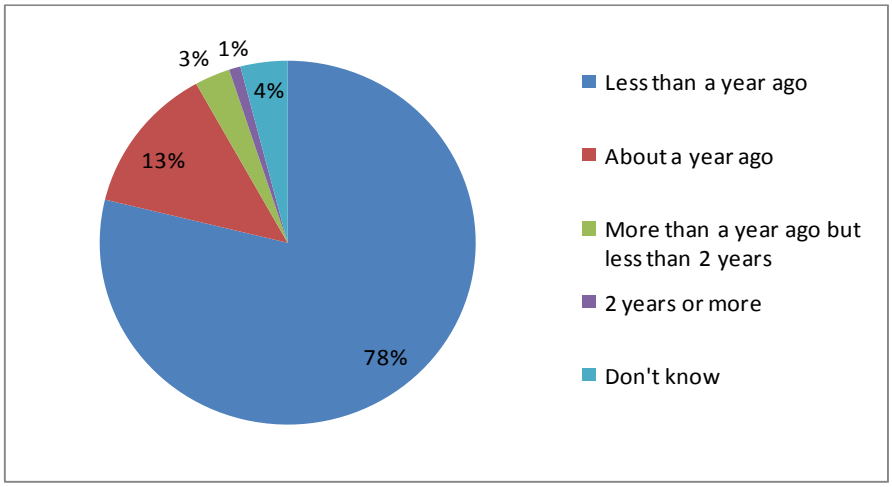
	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Single or twin disc	67%*	81%	83%	80%
Sprayer (boom/hydraulic)	12%	8%	8%	7%
Oscillating spout	10%	5%	7%	3%
Pneumatic	6%	-**	1%	3%
Augur	-	1%	-	1%
Spinner	2%	-	-	1%
Drill Type	-	2%	-	-
Vacon	-	-	-	1%
Don't know	3%	3%	1%	3%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

The single or twin disc spreader was commonly used across all farm types, sizes and regions, but was less likely to be used in the North (67%) than elsewhere and most common on large farms (85%). The oscillating spout was most frequently used by small farms (10%), and usage decreased as the farm size increased. A sprayer was significantly more likely to be used on cereal farms than other farm types (14%). A

pneumatic spreader was not used by the mixed farms or small farms within the sample, which may be related to the relative cost of this machinery.

Figure 5: When the fertiliser spreader was last calibrated



Base: All respondents n=301

The vast majority of farmers indicated that the fertiliser spreader had been calibrated less than or about a year ago (91%). 4% indicated the spreader had been calibrated over a year ago, whilst 4% weren't sure when it was calibrated. A contractor applied the N fertiliser on 92% of the farms where the farmer did not know when the spreader had been calibrated

Although the largest proportion of mixed farms indicated the spreader had been calibrated within the last year, this farm type was significantly the least likely to have the spreader calibrate annually. Farms in the East of England were significantly the most likely to have had the spreader calibrated within the last year. There was a suggestion that the larger farms were the most likely to have had the spreader calibrated within the last year however this difference was not significant.

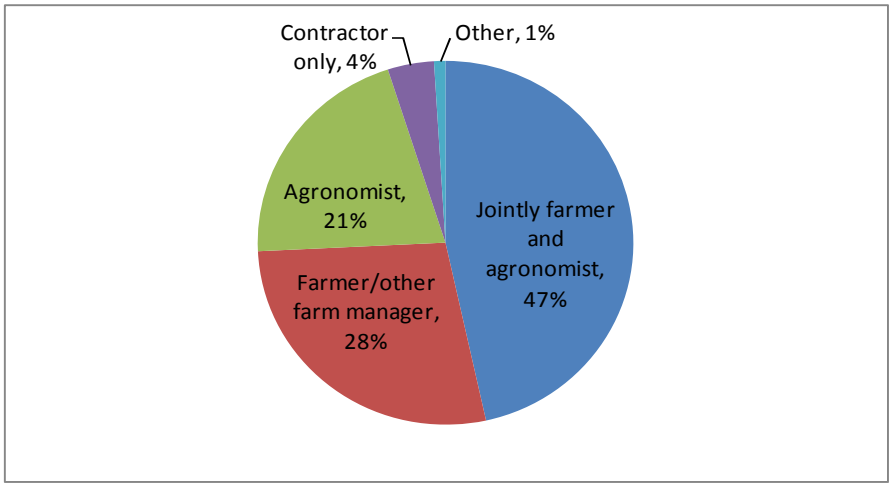
Table 7: When the fertiliser spreader was last calibrated by farm type, farm size and region

	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Less than a year ago	78%	81%	84%	66%**	77%	72%	85%
About a year ago	13%	12%	10%	19%	12%	14%	14%
More than a year ago but less than 2 years	3%	1%	3%	8%	5%	3%	-**
2 years ago or more	1%	1%	-*	3%	1%	2%	1%
Don't know	4%	5%	4%	5%	5%	9%	-**

	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Less than a year ago	70%	78%	79%	87%*
About a year ago	15%	15%	13%	8%
More than a year ago but less than 2 years	8%	3%	1%	-**
2 years or more ago	3%	1%	1%	-*
Don't know	5%	3%	5%	4%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Figure 6 The main person who decides how much manufactured N fertiliser to apply



Base: All respondents n=301

Both the farmer and the agronomist had a key role in the decision about how much N fertiliser to apply. The advisor was the sole decision-maker on 21% of farms but a joint decision-maker on a further 47%. Thus agronomists had an influence on 68% of farms. The farmer was the key decision-maker on 28% of farms, but a joint decision-maker on 47%. Thus the farmers had an influence on the decision on 75% of farms.

There were no clear differences by farm type or size, but with regard to region the farmer was more likely to be the sole decision-maker in the North than elsewhere. Agronomists were more likely to be the sole decision-maker in the East than elsewhere, whilst a joint decision between the agronomists and farmer was most likely in the South.

Table 8: Main person who decides how much N fertiliser to apply by farm type, size and region

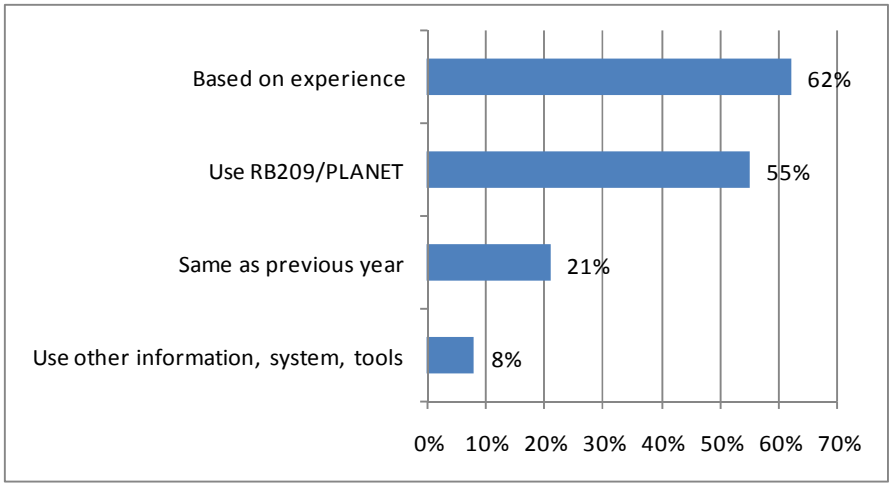
	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Jointly farmer and agronomist	47%	46%	49%	46%	44%	52%	48%
Agronomist	21%	21%	21%	19%	19%	20%	24%
Farmer/other farm manager	28%	30%	24%	30%	32%	23%	26%
Contractor only	4%	3%	5%	3%	5%	5%	1%*
Other	1%	-	1%	2%	1%	-	1%

	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Jointly farmer and agronomist	40%	46%	59%*	41%
Agronomist	16%	19%	17%	30%*
Farmer/other farm manager	40%*	27%	21%	26%
Contractor only	3%	8%*	3%	-**
Other	-	-	-	3%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

With regard to soil type, the farmer alone was more likely to be the main decision-maker on sandy or light soils than other soil types (45%) (significantly different to the remaining sample at the 99% level).

Figure 7: How you decide how much N fertiliser to apply (prompted)



Base: Farmers who solely or jointly decide how much N fertiliser to apply n=226

In total, 63% of the farmers who jointly or solely made the decision as to how much N fertiliser to apply used a specific tool or system, the majority making use of RB209 or PLANET. 37% therefore relied only on experience or used the same amount as in a previous year. A substantial proportion of farmers used both information tools and experience to determine the amount to apply.

With regard to the category "other information, systems or tools," many different systems or tools were mentioned. The most commonly mentioned were soil testing, agronomist, Manner and calculations from books.

Table 9: Other information systems and tools

Base	***18***
Soil testing	33%
Agronomist	11%
MANNER	11%
Calculations from books	11%
Muddy Boots	6%
N Plan	6%
Greenleaf area maps	6%
Grain protein content	6%
Grow How system	6%
YARA planner	6%
GPS variable applications	6%
Fertiliser company provided system	6%
Taught at college	6%

Take into account previous crop history, growth strategy, varieties, rainfall	6%

Table 10: How the farmer decides how much N to apply by farm type, size and region

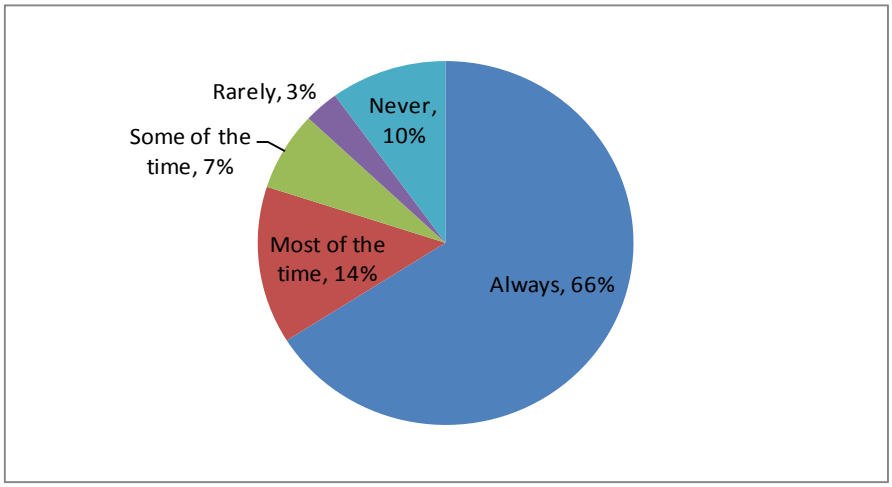
	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	*226*	*117*	*58*	*51*	*109*	*49*	*68*
Based on experience	62%	58%	60%	75%*	67%	55%	60%
Use RB209/PLANET	55%	59%	64%	35%**	49%	65%	57%
Same as in previous year	21%	16%	24%	28%	18%	25%	22%
Use other systems/ information/tools	8%	7%	10%	8%	6%	8%	12%

	North	Midlands	South	East
Base	*54*	*65*	*61*	*46*
Based on experience	72%	66%	54%	57%
Use RB209/PLANET	39%**	54%	54%	76%**
Same as in previous year	20%	31%*	18%	11%*
Use other systems/ information/tools	13%	3%*	10%	7%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Mixed farms were significantly more likely to base their decision on past experience than other farm types and less likely to use RB209 or PLANET. Farms in the East of England were significantly more likely than farms elsewhere to use RB209 or PLANET, whilst farms in the North were less likely than farms elsewhere to do so.

Figure 8: Frequency of taking into account the soil N before deciding how much N fertiliser to apply (prompted)



Base: Farmers who solely or jointly decide how much N fertiliser to apply n=226

66% of the farmers who were involved in deciding how much N fertiliser to apply always took the soil N into account, whilst a further 14% did so most of the time. 10% never took the soil N into account, whilst 10% did so only sometimes or rarely.

There were no clear differences by farm size and region, however the mixed farms were significantly more likely than other farms to never take the soil N into account (20%).

Table 11: How often soil N was taken into account by farm type, size and region

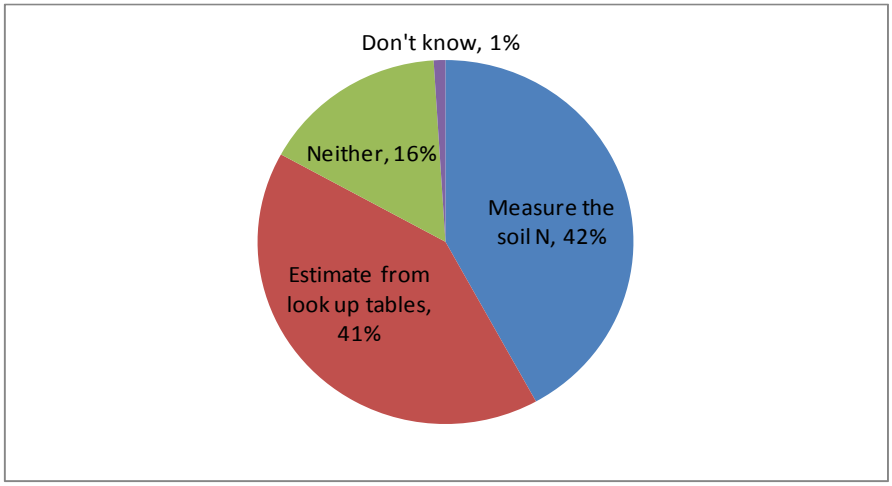
	Total	Cereal	Gen Crop	Mixed	Small	Med	Large
Base	*226*	*117*	*58*	*51*	*109*	*49*	*68*
Always	66%	72%	59%	61%	62%	67%	71%
Most of the time	14%	11%	19%	14%	17%	10%	12%
Some of the time	7%	7%	10%	4%	5%	12%	7%
Rarely	3%	4%	2%	2%	4%	4%	2%
Never	10%	6%*	10%	20%*	13%	6%	9%

	North	Midlands	South	East
Base	*54*	*65*	*61*	*46*
Always	67%	69%	66%	61%
Most of the time	11%	15%	8%	22%
Some of the time	6%	3%	10%	11%
Rarely	4%	5%	3%	-**

Never	13%	8%	13%	7%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Figure 9: Whether the soil N was measured or estimated from look up tables



Base: Farmers who take the soil N into account always, most of the time, some of the time or rarely n=203

Amongst those farmers who took the soil N into account, similar proportions actually measured the soil N (42%) or estimated it from look up tables (41%). 16% however did neither, which suggests they based their decision on experience and their own judgement.

The small farms were significantly the most likely not to either measure the soil N or use look up tables (23%), whilst the large farms were the least likely (7%). No other clear differences were evident by farm type or region.

Table 12: Whether the soil N is measured or estimated via look up tables by farm size

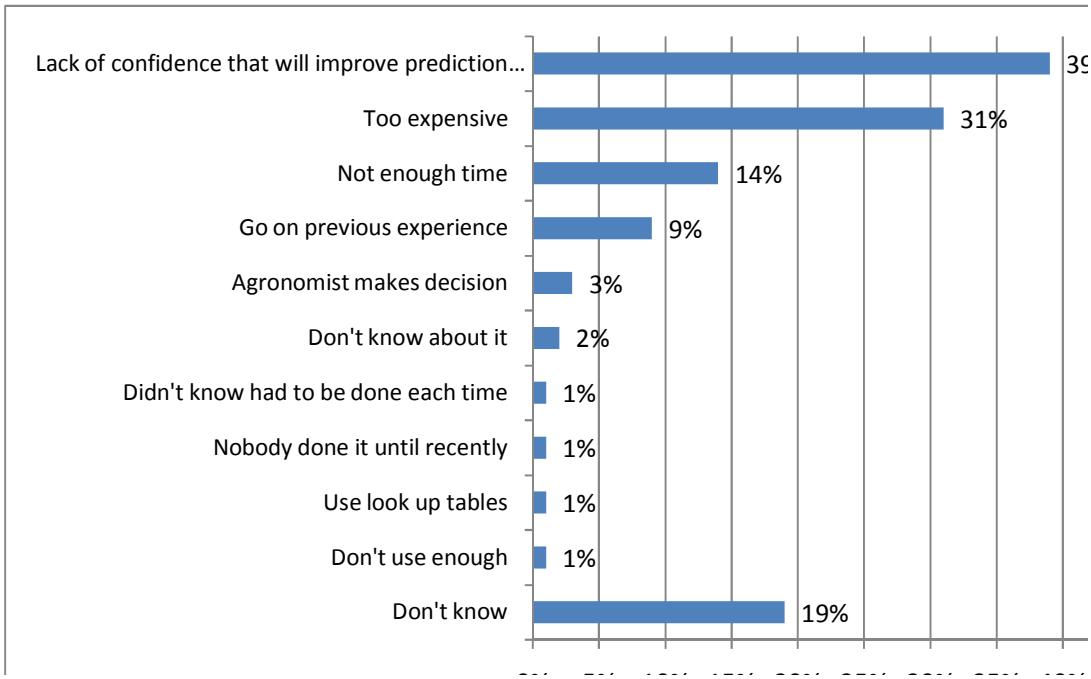
	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*203*	*110*	*52*	*41*	*95*	*46*	*62*
Measure soil N	42%	46%	40%	34%	35%	48%	48%
Estimate from look up tables	41%	39%	39%	51%	41%	37%	45%
Neither	16%	15%	19%	15%	23%**	13%	7%**
Don't know	1%	1%	2%	-	1%	2%	-

	North	Midlands	South	East
Base	*47*	*60*	*53*	*43*

Measure soil N	38%	35%	51%	44%
Estimate from look up tables	49%	48%	32%	35%
Neither	13%	17%	13%	21%
Don't know	-	-	4%	-

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Figure 10: Reasons for not measuring soil N



Base: Farmers that don't measure the soil N n=118

The key reasons given for not measuring the soil N were a lack of confidence that it will improve the prediction of the N fertiliser requirement (39%) and a belief that it is too expensive (31%). A small proportion of farmers cited reasons related to lack of knowledge e.g. don't know about it (2%), didn't know it had to be done each time (1%), nobody has done it until recently (1%).

The general cropping farms were significantly the most likely to mention that they lacked confidence that measuring the soil N would improve the N fertiliser prediction (52%), and the least likely to mention lack of time (3%).

Table 13: Reasons for not measuring the soil N (top 3 answers only)

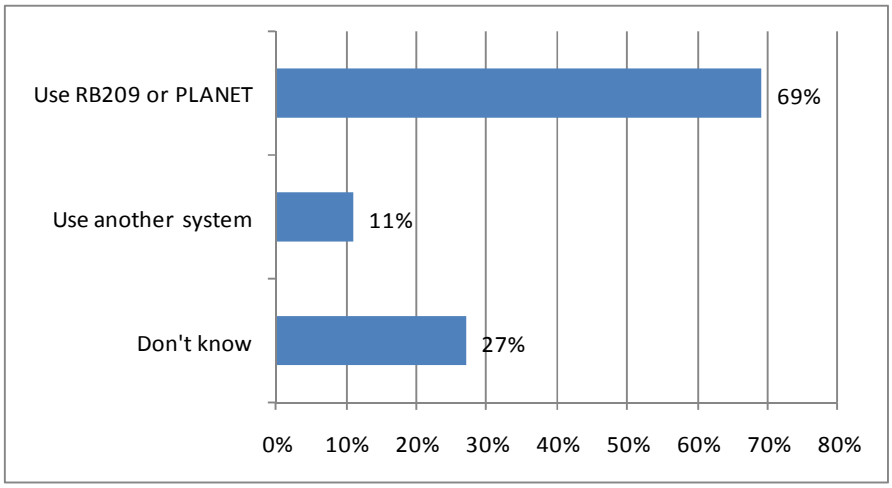
	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*118*	*60*	*31*	*27*	*62*	*24*	*32*
Lack of confidence	36%	37%	52%*	19%	32%	29%	50%

Too expensive	31%	33%	26%	30%	29%	29%	34%
Not enough time	14%	15%	3%**	22%	11%	13%	19%

	North	Midlands	South	East
Base	*29*	*39*	*26*	*24*
Lack of confidence	45%	39%	31%	29%
Too expensive	28%	33%	27%	33%
Not enough time	7%	18%	19%	8%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Figure 11: How the advisor decides how much nitrogen to apply (prompted)

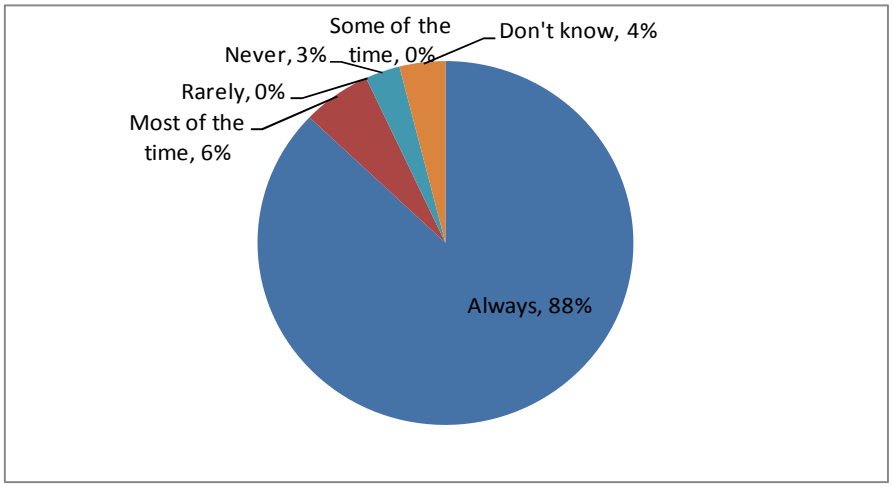


Base: Farms where an advisor alone decides how much manufactured nitrogen fertiliser to apply n=73

On just over 2/3 of the farms where an advisor decided how much manufactured nitrogen to apply, the advisor based his decision on the recommendations from RB209 or PLANET. 11% used another system, and on 7% of farms the advisor used more than one source of information. 27% of the farmers did not know which tool the advisor made use of. Thus the proportion actually using RB209 could in fact be higher.

The other systems used included experience (38%), soil nitrogen tests (25%), a nitrogen management plan (13%), Root Planner system (13%), tissue test (13%) and the green area index (13%).

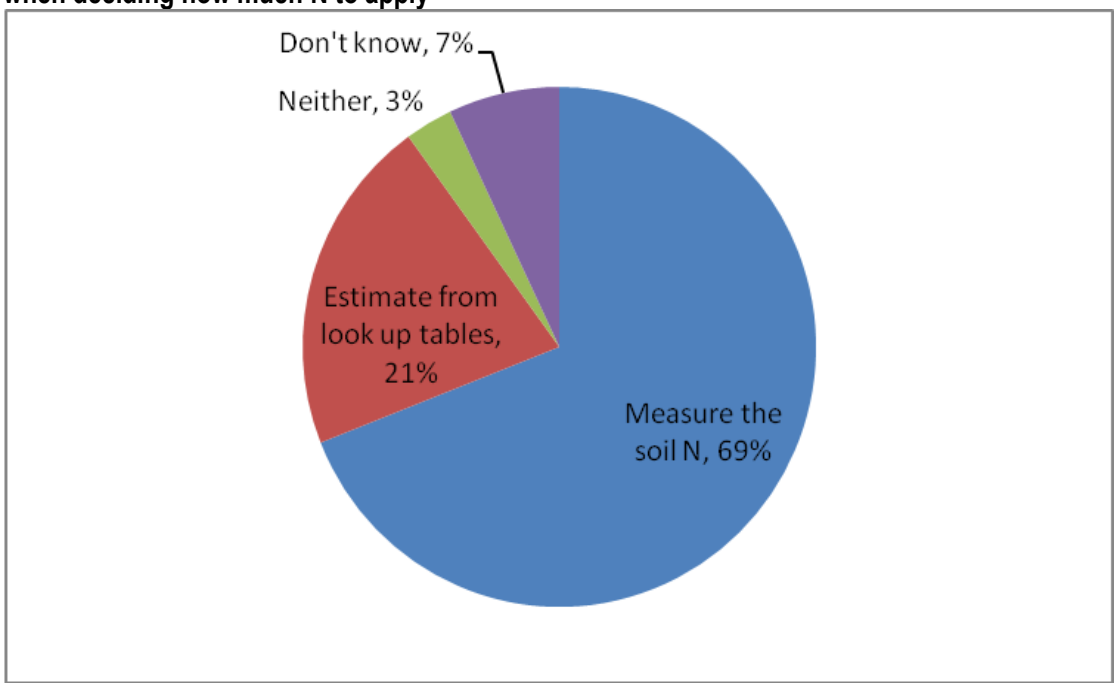
Figure 12: How often the advisor takes into account the amount of N in the soil when deciding how much N to apply (prompted)



Base: Farms where the advisor alone decided how much manufactured nitrogen to apply n=73

In the majority of cases (88%) the advisor took the soil N into account when deciding how much manufactured nitrogen to apply. On 6% of farms where the advisor was the key decision-maker the soil N was considered most of the time, whilst on 3% of farms the soil N was never taken into account. On a further 4% of farms the farmer was unsure whether or not the soil N was taken into account.

Figure 13: Whether the advisor measures the soil N or estimates it from look up tables when deciding how much N to apply

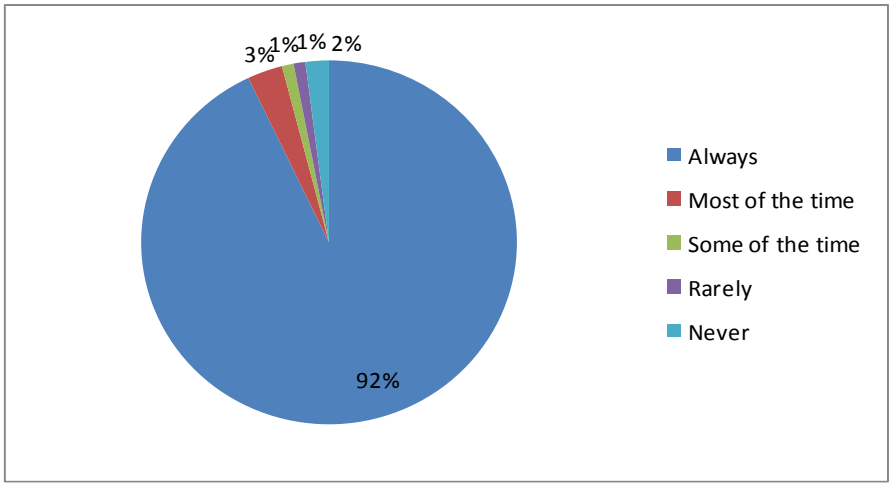


Base: Farms where the advisor took the soil N into account n=71

Where the soil N was taken into account, the majority of advisors appeared to measure the soil N (69%), whilst 21% estimated it from look up tables. In 3% of cases

neither of these methods was known to be used. 7% of the farmers did not know what method the advisor used to determine the soil N content.

Figure 14: How often the farmer or advisor takes into account the amount of manure N when deciding how much manufactured N to apply to cereals or oilseed rape (prompted)



Base: All those respondents who applied manure n=222

74% of the sample appeared to apply manure to the land on which they grew cereals or oilseed rape.

92% of those who applied manure always took manure N into account. 3% did so most of the time, 1% some of the time and 1% rarely. 2% never took this into account.

Of the 7% (17 respondents) who did not always take the manure N into account, the largest proportion (41%) didn't believe it would make much difference to the amount of N that they need to apply. 29% hadn't thought about taking the manure N into account, whilst 29% only used manure occasionally, and the remaining 6% felt they knew their land and as such didn't need to estimate the manure N.

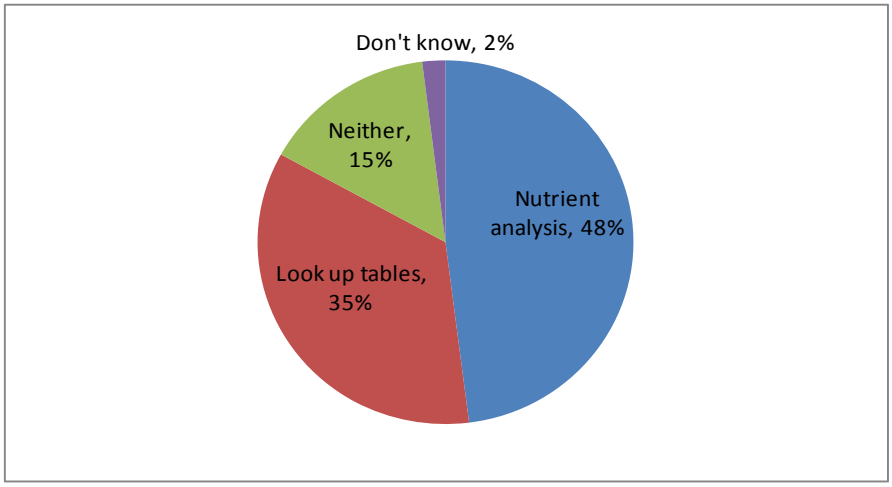
Table 14: Whether manure N is taken into account by farm type, size and region

	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Proportion who apply manure	74%	68%	71%	91%	66%	74%	86%
Base (those who apply manure)	*222*	*104*	*57*	*61*	*95*	*48*	*79*
Always	92%	93%	91%	92%	89%	88%	99%
Most of the time	3%	3%	4%	3%	5%	2%	1%
Some of the time	1%	-	4%	2%	2%	2%	-
Rarely	1%	3%	-	-	-	6%	-
Never	2%	1%	2%	3%	3%	2%	-

	North	Midlands	South	East
Proportion who apply manure	82%	69%	82%	64%
Base (those who apply manure)	*55*	*61*	*62*	*44*
Always	91%	95%	92%	91%
Most of the time	-	5%	3%	5%
Some of the time	2%	-	2%	2%
Rarely	2%	-	3%	-
Never	5%	-	-	2%

The mixed farms, large farms and those based in the South and North were the most likely to apply manure. Farms in the Midlands appeared the most likely to take the manure N into account either always or most of the time, although differences were not significant. The small and medium farms were significantly less likely than the large farms to always take the manure N into account. No differences were apparent by farm type.

Figure 15: When taking manure N into account whether this is based on a nutrient analysis or look up tables



Base: Farmers who take manure N into account n=218

48% of those farmers who took manure N into account when deciding how much nitrogen to apply, actually tested the manure and analysed its nutrient content. A further 35% estimated the nitrogen content via look up tables. 15% did not test for or estimate the nitrogen content.

Table 15: Whether manure N is determined through nutrient analysis or estimated from look up tables by farm type, size and region

	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*218*	*103*	*56*	*59*	*92*	*47*	*79*
Nutrient analysis	48%	51%	52%	41%	45%	53%	49%
Look up tables	35%	33%	36%	37%	35%	36%	34%
Neither of these	15%	15%	13%	19%	20%	4%**	17%
Don't know	2%	2%	-	3%	1%	6%	-

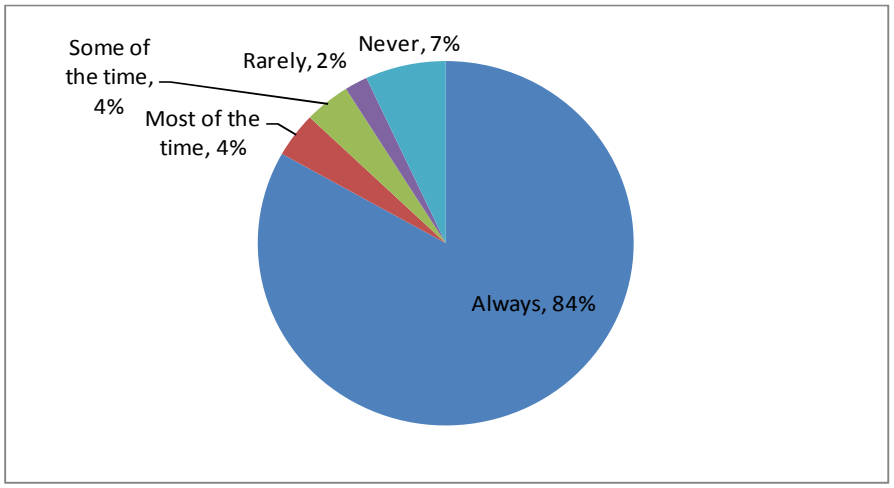
	North	Midlands	South	East
Base	*52*	*61*	*62*	*43*
Nutrient analysis	46%	44%	52%	51%
Look up tables	35%	41%	32%	30%
Neither of these	19%	13%	13%	16%
Don't know	-	2%	3%	2%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

There were no clear differences in the use of nutrient analysis or look up tables by region, farm type or farm size.

Those farms with a medium soil type were significantly less likely (9%) than the remaining sample to use either a nutrient analysis or look up tables (sandy light soil 28%, heavy soil 20%).

Figure 16: When growing oilseed rape how often the farmer or advisor estimates the amount of N in the crop before applying N fertiliser (prompted)



Base: Farmers who apply nitrogen fertiliser to oilseed rape n=168

The majority of those who applied nitrogen fertiliser to oilseed rape (84%) always estimated the amount of nitrogen in the crop, whilst a further 4% did so most of the time. 4% did so only some of the time and 2% did so rarely, whilst 7% never took the crop nitrogen into account.

Although the base size is small, there is the suggestion that the mixed farms were the least likely to take the crop nitrogen into account. There were overall no clear differences by farm size or region.

Table 16: When growing oilseed rape whether the amount of nitrogen in the crop is taken into account by farm type, size and region

	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*168*	*108*	*38*	*22*	*62*	*38*	*68*
Always	84%	85%	90%	68%	81%	87%	85%
Most of the time	4%	5%	3%	5%	7%	3%	3%
Some of the time	4%	5%	-*	5%	5%	3%	3%
Rarely	2%	1%	3%	5%	2%	-	3%
Never	7%	5%	5%	18%	7%	8%	6%

	North	Midlands	South	East
Base	*38*	*48*	*42*	*40*
Always	82%	79%	91%	85%
Most of the time	-**	6%	-**	10%
Some of the time	13%*	-*	-*	3%

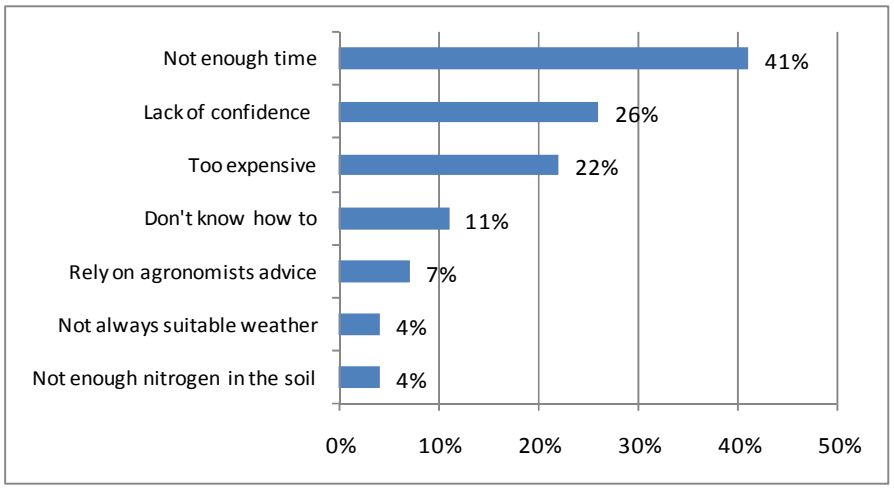
Rarely	-	4%	2%	-
Never	5%	10%	7%	3%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

A number of reasons were given as to why the crop nitrogen was not always taken into account, as shown in the following chart. The most common reason was lack of time, followed by a lack of confidence that it will improve the prediction of the nitrogen fertiliser requirement and also cost.

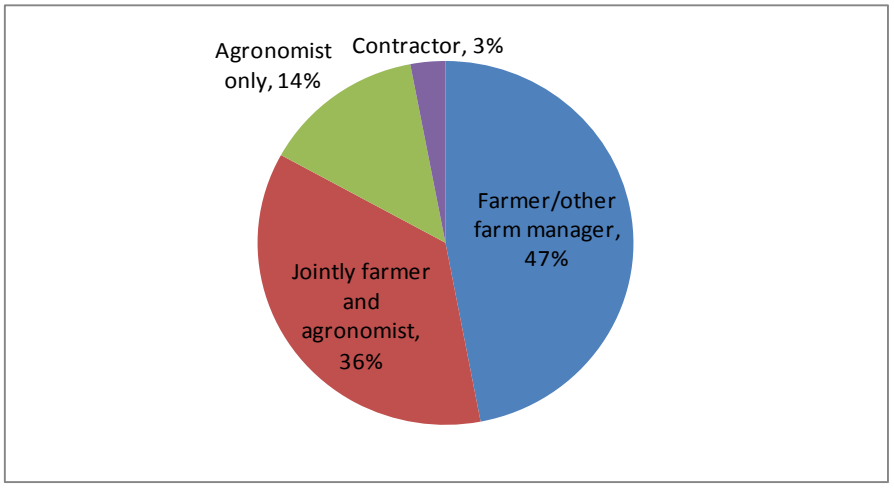
On farms where an agronomist was the main person who decided how much nitrogen to apply, there was a greater likelihood that the crop N would always be taken into account (95%) compared to the remaining sample.

Figure 17: Reasons for not always estimating the amount of N in oilseed rape



Base: Farmers who grew oilseed rape but didn't always take the crop N into account n=27

Figure 18: The main person who decides when to apply manufactured N fertiliser



Base: All respondents n=301

The farmer had a major say in the decision on when to apply the nitrogen fertiliser either alone (47%) or jointly with an agronomist (36%). The agronomist alone decided on only 14% of farms and a contractor decided on 3%.

The farmer had a greater say in when the nitrogen fertiliser was applied than how much should be applied. Comparable figures for the decision how much to apply are as follows: farmer only 28%, jointly farmer and agronomist 47%, advisor only 21%. These figures are significantly different to those in the above chart at the 95% level.

Table 17: The main person to decide when to apply the manufactured N fertiliser by farm type, size and region

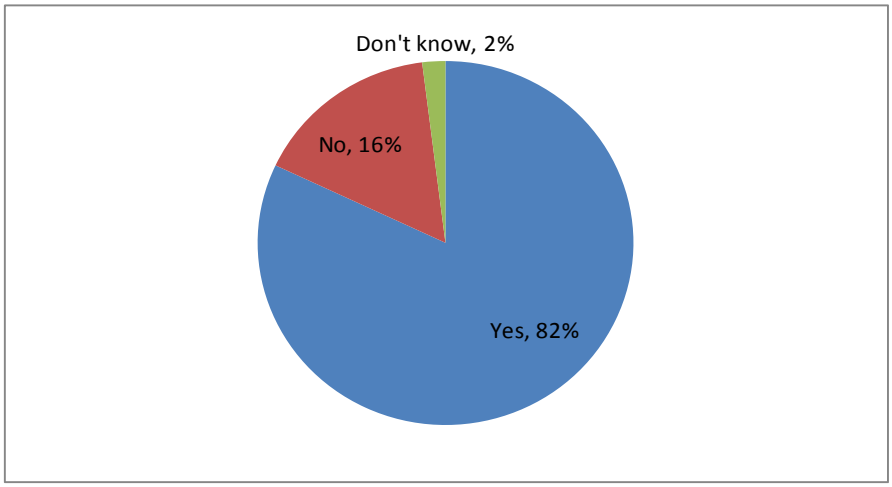
	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Farmer/other farm manager	47%	48%	46%	45%	51%	37%	47%
Agronomist	14%	12%	18%	13%	12%	9%	21%*
Jointly farmer and agronomist	36%	36%	34%	36%	33%	46%*	33%
Contractor	3%	3%	3%	6%	4%	6%	-**
Other	0%	1%	-	-	-	2%	-

	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Farmer/other farm worker	55%	48%	38%	46%
Agronomist	15%	12%	13%	16%
Jointly farmer and agronomist	27%	34%	46%*	35%
Contractor	3%	5%	3%	3%
Other	-	1%	-	-

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

There were no clear differences by farm type. In terms of farm size the medium sized farms were most likely to make a joint decision with an agronomist (46%), and significantly more likely to do this than the remaining sample. An agronomist (21%) was significantly more likely to make the decision on large farms than on other farms. A joint decision was significantly more common in the South than elsewhere (46%).

Figure 19: Whether farmers had a plan for when to apply the manufactured N fertiliser in advance of the application

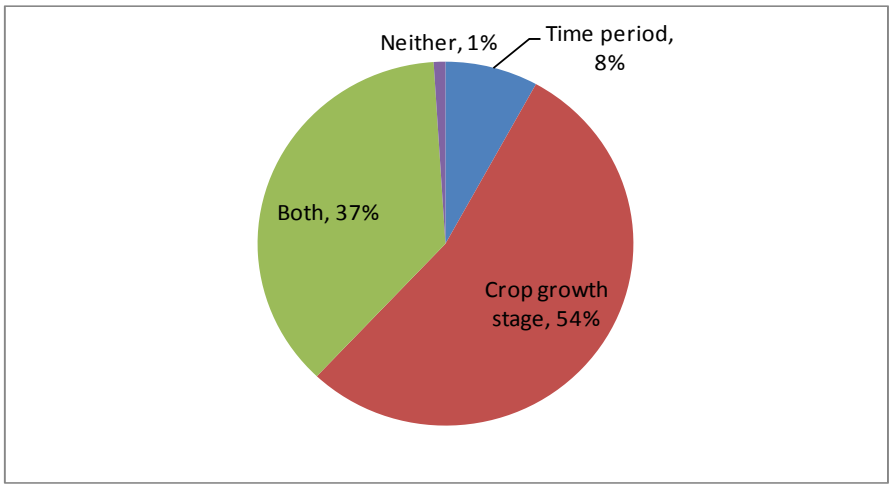


Base: All respondents n=301

82% of the sample had a rough idea when the nitrogen fertiliser would be applied well in advance of the application. This varied little by farm type and size, however the farms in the South (91%) were significantly more likely to have a plan than elsewhere (North 75%, Midlands 85%, East 77%).

The farmers who decided alone when to apply the nitrogen fertiliser were the least likely to have a plan for when to apply the nitrogen ahead of the application (74%, significantly different to the remaining sample at the 99% level). Farmers who decided jointly with an advisor were however the most likely to have a plan (91%, 99% level).

Figure 20: Whether farmers planned to apply the N fertiliser during a certain time period, crop growth stage or both



Base: Those farmers who had a plan for when to apply the N fertiliser n=248

The largest proportion of farmers only took crop growth stage into account (54%), although a further 37% considered both crop growth stage and the time period. Only 8% only considered the time period, and 1% considered neither. Thus overall crop growth stage seems to be a greater driver than time period.

Table 18: Whether farmers had a plan for when to apply the manufactured N fertiliser in advance of the application

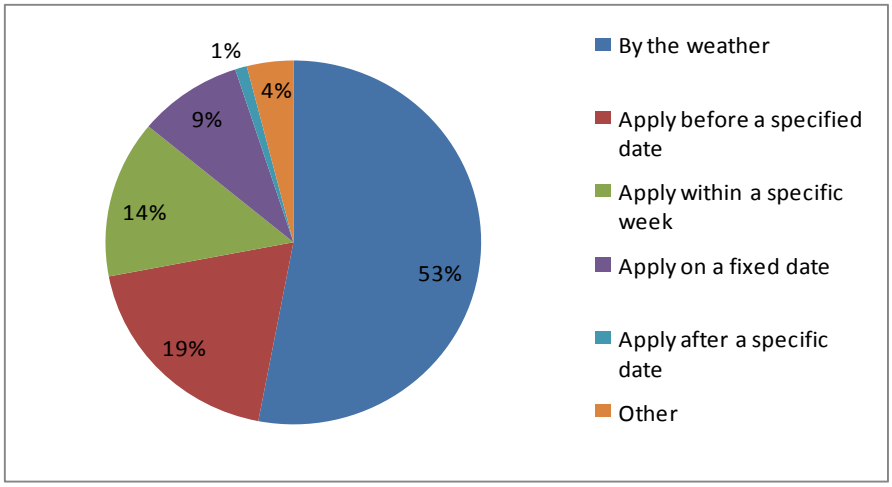
	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*248*	*128*	*64*	*56*	*117*	*56*	*75*
Crop growth stage	54%	52%	61%	50%	52%	59%	52%
Time period	8%	7%	9%	9%	12%*	5%	4%
Both	37%	41%	30%	36%	35%	32%	44%
Neither	1%	-	-	5%	1%	4%	-

	North	Midlands	South	East
Base	*50*	*76*	*69*	*53*
Crop growth stage	56%	41%**	58%	64%
Time period	10%	13%	1%**	8%
Both	34%	43%	39%	28%
Neither	-	3%	1%	-

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

There were no evident differences by farm type, but with regard to size, the small farms (12%) were significantly more likely to only take the time period into account than the remaining farms. The farms in the South were significantly the least likely to only take time period into account (1%). Farms in the Midlands were significantly the least likely to only take crop growth stage into account (41%).

Figure 21: How the time period is defined

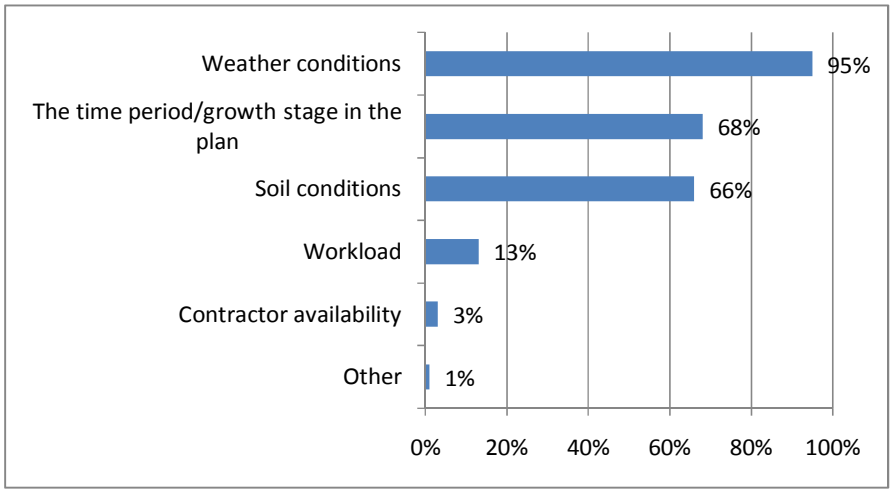


Base: Farmers who took time period into account (either time period only or both time period and crop growth stage) n=112

The weather influenced the decision when to apply the nitrogen fertiliser on 53% of those farms where the decision to apply nitrogen fertiliser was influenced by the time period. This would suggest that farmers are likely to be applying the nitrogen fertiliser in close to optimum weather conditions. 9% applied on a specific date, whilst others showed greater flexibility, applying within a specific week (14%) or before a specific date (19%).

There were no clear differences by farm type, size or region. However, base sizes for many of the sub groups were small, making it difficult to determine any significant differences.

Figure 22: The main factors which influence the actual day that N fertiliser is applied (unprompted)



Base: All respondents n=301

Almost all the farmers took the weather conditions into account when deciding when to apply the fertiliser (95%), whilst similar proportions considered the time period/growth stage in their application plan (68%) and the soil conditions (66%). This suggests that many farmers are attempting to apply the nitrogen in optimal conditions,

but that there is room for improvement in the proportion who are considering the crop growth stage and also the soil conditions in order to ensure maximum precision.

Table 19: The main factors which influence the actual day N fertiliser is applied by farm type, farm size and region (top answers only)

	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Weather conditions	95%	94%	96%	94%	94%	94%	96%
Time period/growth stage in plan	68%	64%	84%**	58%	72%	57%*	70%
Soil conditions	66%	68%	68%	63%	70%	55%*	69%
Workload	13%	13%	18%	9%	11%	11%	19%

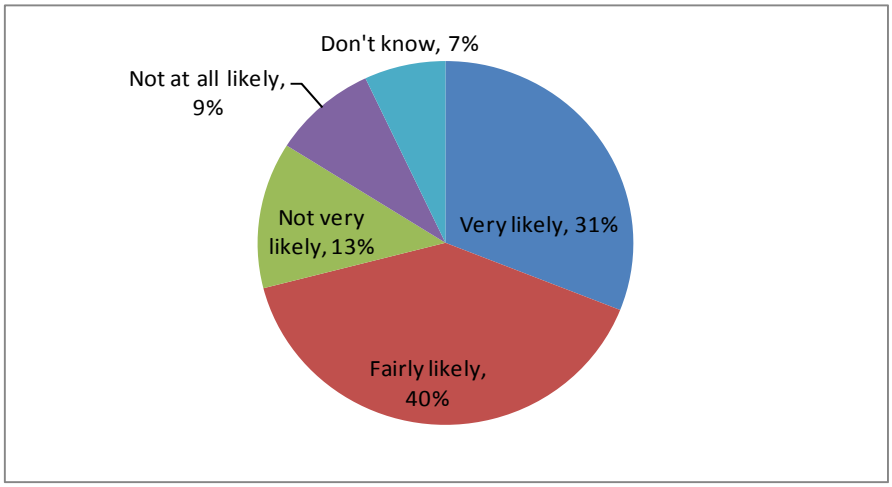
	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Weather conditions	90%	96%	95%	99%
Time period/growth stage in plan	64%	74%	61%	73%
Soil conditions	60%	75%*	51%**	78%**
Workload	3%	21%	16%	10%

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

The weather was the greatest influence on the timing of the fertiliser application across all farm types, farm sizes and regions, however it had more influence in the East (99%) than elsewhere. With regard to time period/growth stage this had more influence on general cropping farms (84%) than elsewhere, but the least influence on medium farms (57%). The influence of the soil conditions was similar across the three farm types, but of least influence on medium farms (55%) and of most influence in the Midlands (75%) and the East (78%). Workload was least likely to have been mentioned on farms in the North, and most likely to be mentioned in the Midlands.

No clear differences were evident by soil type.

Figure 23: Likelihood of applying N fertiliser over 1 extra application, if it reduced air pollution and reduced carbon footprint (prompted)



Base: All respondents n=301

71% of the farmers indicated they were likely to apply the nitrogen fertiliser over one additional application if it was shown that it would reduce air pollution and lower their carbon footprint. 31% were very likely to do this. 22% were unlikely to change their farm practice given this information.

Table 20: Likelihood of applying N fertiliser over 1 extra application if it reduced air pollution and reduced the farm's carbon footprint by farm type, size and region

	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Very likely	31%	37%*	29%	19%*	29%	29%	35%
Fairly likely	40%	34%*	43%	49%	40%	43%	38%
Not very likely	13%	12%	18%	10%	15%	17%	8%*
Not at all likely	9%	9%	9%	10%	10%	8%	10%
Don't know	7%	8%	3%*	10%	7%	3%	10%
Mean score (+1 to +4)	3.0	3.1	2.9	2.9	2.9	3	3.1

	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Very likely	37%	33%	21%*	33%
Fairly likely	25%**	44%	49%	39%
Not very likely	12%	9%	18%	13%
Not at all likely	15%	9%	7%	7%
Don't know	10%	6%	5%	7%
Mean score (+1 to +4)	3.0	3.1	2.9	3.1

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

The cereal farms were the most likely to be very likely to add an extra application (37%, significant difference at the 95% level when compared to the remaining sample), whilst the mixed farms were the least likely (19%, significant difference when compared to the remaining sample at the 95% level). It is possible that the mixed farms have less flexibility with regard the number of applications given their need to also manage livestock on the farm. There were however no clear differences when considering the overall results i.e. the mean scores for each sub sample.

Overall results by region were similar. There were no clear differences by soil type.

Table 21: Likelihood of applying N fertiliser over 1 extra application if it reduced air pollution and reduced the farm's carbon footprint by crop type

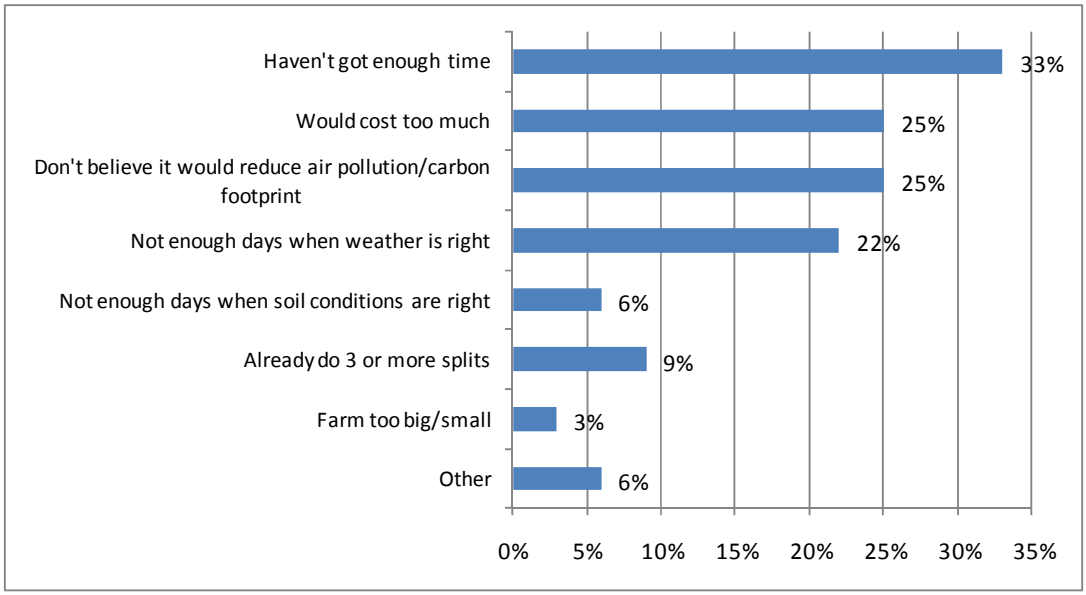
	Winter bread wheat	Winter feed wheat	Winter barley	Spring barley	Oilseed rape
Base	*103*	*239*	*147*	*113*	*168*
Very likely	39%*	30%	31%	29%	37%**
Fairly likely	35%	40%	40%	37%	36%
Not very likely	10%	14%	11%	9%	12%
Not at all likely	8%	9%	9%	16%**	10%
Don't know	9%	8%	10%*	9%	6%
Mean score (+1 to +4)	3.1*	3.0	3.0	2.9	3.0

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Farmers who applied nitrogen fertiliser to winter bread wheat were overall more likely than the remaining sample to apply the nitrogen over an additional split. Those growing spring barley were the least likely to add an extra split. Based on BSFP data 2006-8 nitrogen fertiliser was usually applied to spring barley in one (56%) or 2 (42%)

applications rather than the 3 or 4 applications for oilseed rape, winter barley and winter wheat.

Figure 24: Reasons for not being likely to add an extra application of N fertiliser

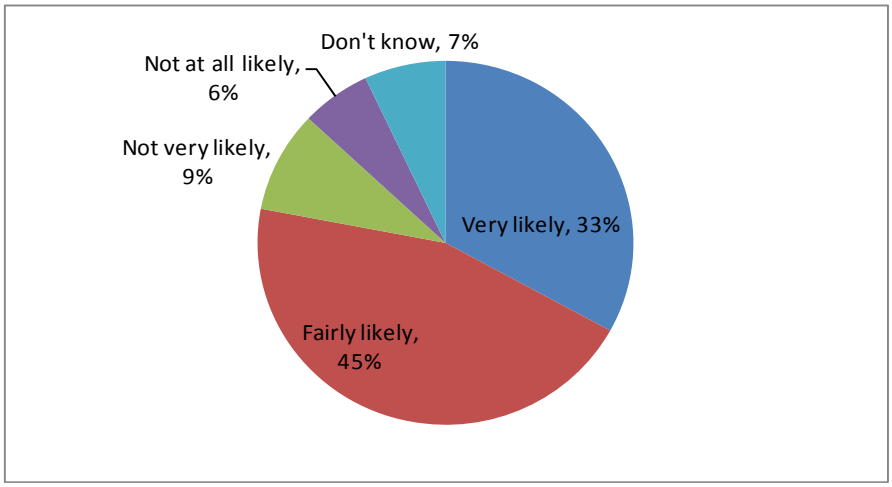


Base: Those not likely to add an extra application of N fertiliser n=67

The main reasons for not being likely to add an extra application were lack of time (33%), cost (25%), lack of belief that it would reduce air pollution and the carbon footprint (25%) and insufficient days available when the weather conditions are right (22%).

The majority of the farmers who indicated that cost would reduce their likelihood of adding an extra split, were likely (very 29%, fairly 24%) to add the extra application if the increase in yield was greater than the cost of the extra application. The remaining respondents (24%) were unsure what they would do.

Figure 25: Likelihood of following advice to avoid applying N fertiliser for 5 days after significant rainfall in order to reduce air pollution, which would mean that the number of available days would reduce by 10 per month (prompted)



Base: All respondents n=301

78% of the sample were likely not to apply nitrogen fertiliser during the 5 days after significant rainfall in order to reduce air pollution, 33% being very likely, even if it meant that this would reduce the number of available days for application by 10 per month. 15% indicated they would be unlikely to do this.

Table 22: Likelihood of avoiding applying N fertiliser during 5 days after significant rainfall to reduced air pollution by farm type, size and region

	Total	Cereal	Gen crop	Mixed	Small	Med	Large
Base	*301*	*154*	*80*	*67*	*144*	*65*	*92*
Very likely	33%	42%**	21%**	27%	33%	42%	27%
Fairly likely	45%	36%**	59%**	49%	43%	48%	46%
Not very likely	9%	9%	11%	6%	8%	8%	11%
Not at all likely	6%	6%	6%	8%	6%	3%	9%
Don't know	7%	8%	3%*	10%	10%	-**	8%
Mean score (+1 to +4)	3.1	3.2*	3.0	3.1	3.1	3.3	3.0

	North	Midlands	South	East
Base	*67*	*89*	*76*	*69*
Very likely	39%	32%	24%*	39%
Fairly likely	28%**	55%*	54%	38%
Not very likely	12%	7%	9%	9%
Not at all likely	12%	2%*	4%	9%
Don't know	9%	5%	9%	6%
Mean score (+1 to +4)	3.0	3.2	3.1	3.1

*shows that there is a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

With regard to farm type, the cereal farms were significantly more likely (mean score 3.2) than the remaining farms to be likely not to apply nitrogen fertiliser in the 5 days following significant rainfall, due mainly to the high proportion who were very likely not to apply during this time period (42%).

Although differences were not significant, the large farms appeared the least likely to be prepared not to apply within 5 days after heavy rain.

Farms in the South were less likely to be very likely to avoid spreading in the 5 days after heavy rain compared to farms in other regions, whilst those in the North were less likely to avoid applying during the 5 days than farms in the Midlands.

Table 23: Likelihood of avoiding applying N fertiliser during 5 days after significant rainfall to reduced air pollution by soil type

	Sandy/light silty	Medium	Heavy	Shallow over chalk or limestone	Peaty
Base	*51*	*139*	*82*	*23*	*6*
Very likely	29%	29%	43%*	26%	50%
Fairly likely	55%	50%	33%**	30%	50%
Not very likely	10%	7%	9%	22%	-
Not at all likely	6%	6%	7%	9%	-
Don't know	-**	8%	9%	13%	-
Mean score (+1 to +4)	3.1	3.1	3.2	2.9	3.5

The farms with heavy soil were significantly more likely to be very likely to avoid spreading during 5 days after significant rainfall and significantly less likely to be fairly likely.

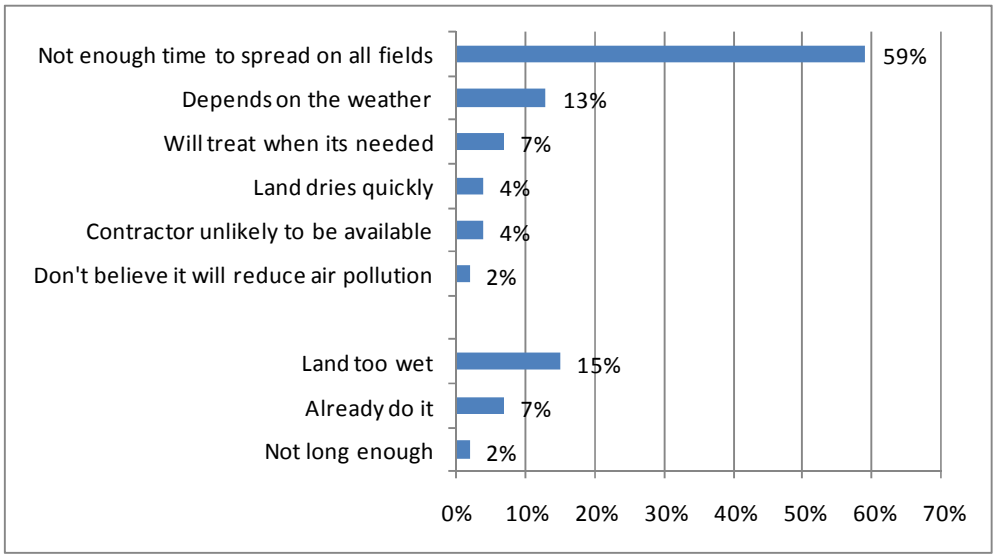
Table 24: Likelihood of avoiding applying N fertiliser during 5 days after significant rainfall to reduced air pollution by crop type

	Winter bread wheat	Winter feed wheat	Winter barley	Spring barley	Oilseed rape
Base	*103*	*239*	*147*	*113*	*168*
Very likely	41%*	33%	30%	30%	36%
Fairly likely	36%*	44%	46%	44%	42%
Not very likely	11%	9%	8%	9%	8%
Not at all likely	6%	6%	8%	10%	8%
Don't know	7%	8%	8%	7%	6%
Mean score (+1 to +4)	3.2	3.1	3.0	3.0	3.1

* shows a significant difference at the 95% level between this figure and the remaining sample
**shows that there is a significant difference at the 99% level between this figure and the remaining sample

Farmers growing winter bread wheat again seemed more likely to adopt advice and avoid applications of nitrogen fertiliser during the 5 days after heavy rain.

Figure 26: Reasons for not being likely to avoid applying N fertiliser during the 5 days after significant rainfall



Base: Those not likely to avoid spreading during the 5 days after significant rainfall n=46

The majority of those who did not suggest they would avoid spreading for 5 days after heavy rain felt they would not have enough time to spread across all their fields if they did so. A number of respondents suggested that they would not normally apply within this time period suggesting that at least a proportion of them may have misunderstood the question.