



## **Aberdeenshire Arable Monitor Farm**

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**Report from Open Meeting and BBQ held 23<sup>rd</sup> July 2013**

**[Open Meeting to promote the project's progress](#)**

**Date of next meeting: Late October 2013**

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The Aberdeenshire Arable Monitor Farm Programme is an HGCA project supported by the Scottish Government SRDP Skills Development Scheme.

This was an Open Meeting held to promote the project to a wider audience. The aim was to showcase the project and give attendees a flavour of some of the issues, topics and learning from the previous two years of the project. Following the welcome from the chairman, Peter Chapman, and a brief introduction to the farm by Andrew the meeting was then split into 6 groups and moved around 6 stations on a farm tour. The 6 stations were manned by members of the Management Group who each described a different aspect. Attendees were moved around the farm via tractor & trailer with each group have a leader.

The Open Meeting was attended by over 60 farmers and members of the trade and was followed by a sit down BBQ, sweet and refreshments at 'The Store', part of the Monitor Farm's successful farmshop /tea room.

#### **The manned stations:**

1. Agronomy; description of rotation, varieties, programmes and see crops
2. Precision farming; view equipment, review approach and experiences
3. Proposed new grain store and biomass drier
4. Yara fertiliser trials incl. urea vrs ammonium nitrate
5. Crop benchmarking, production costs, GMs and key learning
6. The labour challenge - how best to organise farm labour for the future?

This report pulls together the handouts used on the day at each of the stations.

### **General Farm Introduction Handout**

#### **The Project's Objective**

The overall aim of the project is to improve the performance & profitability of the host Monitor Farm and other arable farms in the region. A Monitor Farm helps us to share experiences, find out how others have tackled problems, try out new techniques, bring in the best specialists and do it all on a real farm. The project is funded by Scottish Government and HGCA. Meeting reports can be found on HGCA ([www.hgca.com](http://www.hgca.com)) and SAOS' websites ([www.saos.coop](http://www.saos.coop))

#### **Introduction to business**

Andrew and Dad, George, farm a farm a total of 310ha (766 ac) across 3 blocks. Although both operate separate businesses, effectively the land is farmed as one. 282ha is owned (Savock, Ardgill and Westfield Farm), the balance is on short-term tenancies. Bucksburn Farm, which was on a full tenancy, has recently been given up.

#### **Soils and cultivations**

A range of soils generally on heavy side with clay – which can be unforgiving. Natural drainage is poor. Improving the soil structure is an objective and use has been made of compost over the last 2-yrs. Need extra power to make good seedbeds, some spring cereals will be power harrowed in front of the one-pass drill. The grass weed sterile brome is increasingly common in some fields.

Operate 24m tramlines. Seed is mainly purchased to prevent the spread of brome. Utilise an independent agronomist - Ian Dalley. Have recently moved into full precision farming.

### **Cropping 2013**

<b>Crops</b>	<b>Area (ha)</b>	<b>Varieties</b>	<b>Av 3-yr yield (t/ha)</b>
W OSR	71.2	Cracker, Catana, Compass	3.3
W Barley	82.4	Retreiver, Matros, Bamboo, Volume	7.2
W Wheat	39.1	Viscount, Horatio	7.6
Sp Barley	18.0	Waggon, Odyssey	5.6
Sp Oats	54.6	Firth	5.4
Grass	26.7		
Fallow/grass margins	7.0		
Trees	10.2		
<b>Total</b>	<b>309.2</b>		

### **Livestock**

Finish 200-250 cattle per year, all AA crosses. Purchase yearlings which are kept for 6-12 mths. Need to kill finished animals every fortnight for the Farmshop. Cattle are wintered inside at Savock in two cattle courts plus a dutch barn (hold 200+ hd). Winter rations are based on silage plus barley.

### **Labour & Contractors**

Up to a few months ago, employed one full time man, due to loss of man now considering options. Last year employed a combine driver instead of a harvest student, plan to repeat this year.

Contractors are used for muck spreading, lime spreading and any other specialised jobs.

In addition, the business also carries out a fair bit of contracting work themselves. The aim is to make better use of machinery, to spread the cost.

### **Grain Drying & Storage**

The existing storage and drying system is dated and under review. There is storage for up to 1,000t at Savock and a 20t mobile drier. The proposal is to invest in two on-floor driers of 300-500t each which would provide additional storage utilising biomass burner to earn RHI.

### **Crop Marketing**

All crops are grown for the open market except for a small tonnage saved for own use. Nothing is grown on contract although a percentage of the crops are forward sold. Oats are grown for the premium milling market. Due to the high fertility, no low N malting barley is grown. Instead, spring barley is normally propcorned for the feed market. OSR is marketed through the local co-op - Aberdeen Grain.

### **Diversification into a farmshop – ‘The Store’**

Based at Westfield, ‘The Store’ was established in 2000 to supply the end consumer with beef and lamb grown on the farms as well as sourcing other local produce to sell through the shop. In July 2010 expanded into current building with the introduction of a coffee shop/restaurant with 45 covers and a larger retail space. Today the business has grown to employ 22 staff comprising a farm shop, butchery and coffee shop. In terms of retail outlets, supply 4 farmers markets, five Waitrose stores, local hotels & restaurants other local deli’s and specialised food retailers.

**The Monitor Farm's Gross Output Analysis. (Year end 31<sup>st</sup> May)**

	2010	2011	2012	Target %
Farm Gross Output	100	100	100	100
Variable Costs	28	25	32	30
Farm Gross Margin	72	75	68	70
Labour	8	9	10	30 to 35 labour and power
Power	36	29	32	
Overheads	12	6	9	5 to 10
Gross Profit	16	31	17	30

**Note:**

"Variable Costs" are all input costs which vary directly with the size of the enterprise: seed, fertiliser, sprays, purchased feed, vet, crop and livestock sundries.

"Labour" is all employed labour including casual.

"Power" is fuel, electricity, machinery and vehicle repairs and expenses, depreciation, contractors

"Overheads" are all sundry fixed costs: insurance, professional fees, telephone, office costs, property repairs, miscellaneous costs.

"Gross Profit" is the margin available to cover rent and interest and a Net Profit to provide for living expenses, tax and new investment or debt reduction.

**Main challenges for the business**

- Improving the farm profitability
- What is the optimum grain drying & storage option for the business?
- Controlling production costs, particularly machinery costs
- Crop marketing, coping with market volatility
- Farming heavy land – how best establish the crops?
- Adopting new technology (Precision Farming)
- Improving record keeping and business analysis.
- To future proof the business - designing a system for the next 10-yrs.

## Future Labour /Machinery policy?

Andrew has recently lost his one employee. What would you advise?

### What are the Options?

- Find a new employee
- Opportunity to bring in a new entrant
  - A junior partner?
  - Formal Share Farming agreement
  - Incentivised Employment Contract
- Contractor(s)/Machinery Ring – whole job or part of the workload
- A Contract Farming Agreement
- Let it all out – annual/SLDT/LDT
- Neighbouring
  - Level 1 = share some machinery and labour
  - Level 2 = pool machinery in a separate business
  - Level 3 = pool entire cropping enterprise

### Get a new employee

Pluses	Minuses
<ul style="list-style-type: none"> <li>• This is quite a difficult farm/soil type – need excellent timeliness, so best with own employee and kit</li> <li>• Have livestock – need a man to allow 7 day cover</li> <li>• Got all the machinery already, and all fairly new so cost of switch to contract options is high</li> <li>• Own staff = control, timeliness, lower risk, don't need to manage contractors/contracts</li> </ul>	<ul style="list-style-type: none"> <li>• Finding a good tractorman</li> <li>• Competition with higher wage oil jobs</li> <li>• Poaching risk</li> <li>• Sheer cost – need to pay well for correct person and needs a house as well which could otherwise be let</li> <li>• Would Andrew be happy with another employee? Character/objectives fit?</li> <li>• Employment hassles and red tape</li> </ul>

### Contractor(s)

Pluses	Minuses
<ul style="list-style-type: none"> <li>• Reduce overall machinery cost</li> <li>• Get newest kit on to the farm e.g. GPS (and can pick and choose contractors to get that)</li> <li>• Get skilled operators</li> <li>• Reduced/ no labour cost</li> <li>• Could be better timeliness in some situations because get bigger kit</li> <li>• Can match use to seasonal demands so no excess labour/over capacity</li> <li>• Can let out employees house</li> </ul>	<ul style="list-style-type: none"> <li>• Timeliness compromised, especially in a difficult season when all the contractors are needed everywhere at the same time</li> <li>• Contractor cost</li> <li>• Lower asset value</li> <li>• Less flexibility – someone to keep an eye on the farm and livestock, tackle extra jobs, work on infrastructure (drains etc), general upkeep</li> <li>• No continuity/build up of farm specific knowledge</li> <li>• Mistakes due to poor communication</li> </ul>

### Neighbouring

Pluses	Minuses
<ul style="list-style-type: none"> <li>• Brings together a range of land types which therefore spreads the type of crop and timings so workload is also spread out</li> <li>• Can block crops better</li> <li>• Have a bigger labour pool</li> <li>• Could combine storage so have one good sized store and drier</li> <li>• Scope to add new developments e.g. a weighbridge, because have scale to justify them</li> <li>• Buying strength</li> <li>• Rationalise labour?</li> <li>• Reduced cost per acre</li> <li>• Frees up management time</li> </ul>	<ul style="list-style-type: none"> <li>• Cost of setting up and operating a separate “contract” business</li> <li>• Tax implications</li> <li>• Livestock demands can’t be pooled so easily</li> <li>• Potential for conflict – need the correct attitude/relationship</li> <li>• Difficult to get the part-time/peak labour you might need if reduce permanent labour force</li> </ul>

### Contract Farming Agreement

Pluses	Minuses
<ul style="list-style-type: none"> <li>• Tax efficient – still classed as a farmer so don’t lose any Inheritance Tax reliefs</li> <li>• Releases working capital (sell machinery etc)</li> <li>• Still keep some control of farming policy (unlike renting out)</li> <li>• More flexible in length than renting or employing a tractorman</li> <li>• Frees up management time and is less day to day hassle – good for Andrew with his other business</li> <li>• Benefit of big kit and skilled operators</li> <li>• The agreement builds in an incentive for the contractor to do a good job</li> <li>• It’s contract law so very flexible, can build in livestock</li> </ul>	<ul style="list-style-type: none"> <li>• Potential for disagreement – need the correct people</li> <li>• Some extra admin/legal cost – best if have third party oversight</li> <li>• Andrew would not be physically hands-on</li> </ul>

**Incentivised new entrant – formal share farming or incentivised employee (bonus for good performance) or similar**

Pluses	Minuses
<ul style="list-style-type: none"><li>• Frees up Andrews time</li><li>• Attracts better quality of staff – self motivated, ambitious, have own aims</li><li>• Well motivated staff</li><li>• Potential to grow the business</li><li>• No employee hassle if go share farming</li></ul>	<ul style="list-style-type: none"><li>• Is there enough margin to share?</li><li>• Capital required from the new entrant – many don't have capital</li><li>• Must be confident in the person brought in – difficult to assess without track record</li><li>• Will the skills and abilities of the new person clash?</li><li>• Still have problem of competing with oil sector wages</li><li>• Complex contracts</li><li>• Tax implications – are you still a farmer? Also SFP Entitlement concerns.</li><li>• We don't have many models to draw upon</li></ul>

## **The Arable Business Group (ABG)**

### **Summary**

- In addition to the Arable Monitor Farm, HGCA supported an Arable Business Group (ABG) in the north-east.
- The ABG aims to bring progressive arable growers together to benchmark their businesses, meet regularly and consider ways how to improve their businesses performance.
- At the core of the ABG is benchmarking, calculating production costs and making comparisons with others.
- The benchmarking is undertaken utilising HGCA's 'CropBench'. It is simple to use and ensures the figures produced use the same methodology which is very important.
- Although benchmarking is at the heart it is much more than that, the focus is on real practical issues so includes comparisons of systems, marketing, managing risk, new technology, succession, finance, etc.
- All commercially sensitive information is standardized, confidentiality is at the core of the project.
- There are 12 members in the closed group who meet 3 times a year.

### **Reasons why members joined the Group:**

- *Improve my marketing - gathering experiences of others*
- *Hoping to improve my crop yields*
- *Identify how to reduce production costs*
- *Understand folks' production systems and how do you manage large complex businesses*
- *Better understanding of spray costs and their effective use*
- *Getting ideas from others /innovation*
- *The farm visits and going on learning journeys*
- *How do you improve the fertility and organic matter in non-livestock farms?*
- *Livestock options for arable farms*
- *Buying inputs, sharing information – maybe forming buying groups*
- *The discipline and peer pressure to actually carry out the costings!*

### **Some of the Learning**

- ✓ Production costs higher than expected
- ✓ Two key factors impact on profitability; the final yield and average selling price.
- ✓ Huge variation in average selling prices across group – effective marketing (how achieve?)
- ✓ Successful establishment is crucial particularly for autumn sown crops
- ✓ Don't scrimp on inputs. Little scope to reduce variable costs – seed, fert, agrochemical
- ✓ Huge variation in fixed costs (overheads) particularly machinery & power costs
- ✓ Don't over-sell crops
- ✓ Watch cut-off sowing dates particularly for autumn crops
- ✓ Benefit of rotation and mix of crops
- ✓ Need to keep organic matter levels up in all-arable systems
- ✓ Timeliness and attention to detail is paramount



## Example of the output from the ABG.

### 2012 Production figures £ per tonne before rent and interest.

Also includes the range – low and high and the previous year's (2011) figs for comparison.

Aberdeen Benchmarking Results (£ per tonne before rent & interest)											
<b>Sp Barley 2012</b>						<b>W Barley 2012</b>					
<b>£ per Tonne</b>	<b>Savo</b>	<b>Av</b>	<b>Low</b>	<b>Hi</b>	<b>2011</b>	<b>£ per Tonne</b>	<b>Savo</b>	<b>Av</b>	<b>Low</b>	<b>Hi</b>	<b>2011</b>
Seeds	16	12	5	16	10	Seeds	11	11	4	18	10
Fertilisers	39	33	7	46	23	Fertilisers	35	36	14	47	26
Sprays	14	13	11	18	12	Sprays	16	17	14	25	15
Sundries	0	1	0	2	1	Sundries	0	1	0	2	1
<b>Total Variable Costs</b>	<b>69</b>	<b>59</b>	<b>34</b>	<b>70</b>	<b>46</b>	<b>Total Variable Costs</b>	<b>62</b>	<b>64</b>	<b>45</b>	<b>88</b>	<b>52</b>
Labour	28	23	13	31	20	Labour	20	22	13	32	19
Machinery	46	50	38	64	44	Machinery	38	46	29	69	42
Property	8	7	5	11	5	Property	9	6	3	9	4
Admin	14	8	3	14	7	Admin	11	7	3	13	5
<b>Total Overheads</b>	<b>96</b>	<b>89</b>	<b>67</b>	<b>116</b>	<b>76</b>	<b>Total Overheads</b>	<b>78</b>	<b>81</b>	<b>56</b>	<b>115</b>	<b>70</b>
<b>Production Cost</b>	<b>165</b>	<b>147</b>	<b>117</b>	<b>184</b>	<b>122</b>	<b>Production Cost</b>	<b>140</b>	<b>145</b>	<b>112</b>	<b>183</b>	<b>122</b>
<b>Wheat 2012</b>						<b>OSR 2012</b>					
<b>£ per Tonne</b>	<b>Savo</b>	<b>Av</b>	<b>Low</b>	<b>Hi</b>	<b>2011</b>	<b>£ per Tonne</b>	<b>Savo</b>	<b>Av</b>	<b>Low</b>	<b>Hi</b>	<b>2011</b>
Seeds	12	13	10	16	8	Seeds	19	25	17	35	16
Fertilisers	41	37	17	56	26	Fertilisers	68	87	37	119	51
Sprays	25	21	16	25	16	Sprays	43	45	36	63	30
Sundries	0	1	0	2	1	Sundries	0	1	0	5	2
<b>Total Variable Costs</b>	<b>78</b>	<b>72</b>	<b>54</b>	<b>90</b>	<b>51</b>	<b>Total Variable Costs</b>	<b>130</b>	<b>159</b>	<b>116</b>	<b>208</b>	<b>99</b>
Labour	21	23	13	36	18	Labour	41	48	22	58	33
Machinery	38	47	29	78	39	Machinery	75	123	67	147	73
Property	6	6	4	11	4	Property	11	17	9	24	7
Admin	11	7	2	11	5	Admin	25	20	6	23	10
<b>Total Overheads</b>	<b>75</b>	<b>83</b>	<b>53</b>	<b>129</b>	<b>66</b>	<b>Total Overheads</b>	<b>152</b>	<b>208</b>	<b>134</b>	<b>235</b>	<b>123</b>
<b>Production Cost</b>	<b>153</b>	<b>155</b>	<b>126</b>	<b>220</b>	<b>117</b>	<b>Production Cost</b>	<b>282</b>	<b>367</b>	<b>279</b>	<b>398</b>	<b>222</b>

## **Agronomy Challenges**

The farm's agronomist described the farm's rotation, soils, agrochemical programme and approach to the group.

### **The main challenges for the Monitor Farm include:**

- Heavy difficult soils – less muck than in the past, some rotations no grass, wet seasons and operating in a late region. Trying to assess the benefit of apply bought-in compost (major 3-year trial) – does it have long term potential? Should we chop and incorporate straw? Does Min Till via a sub-soiler to establish OSR help? How do you improve soil structure?
- Yields disappointing and on the low side when benchmarked with the ABG group. Lots of poor areas, end rigs, etc which lower overall field yields. Are the input levels high enough? Are hedging bets too much and reducing inputs to match yield potential?
- Difficult to stick to rotations because of weather, late season, wet fields, etc. - is this critical?
- Too many crops - too much to get right, too complex?
- Has winter oats got a place in the rotation? Is yield and margin better than alternatives? Produces volunteer oat problem?
- Sterile problem is increasingly a problem and expensive to control.
- Outlying land on short term lease /uncertain future so difficult to justify lime – low pH so only oats.
- Grain drying capacity and single bulk store limits the crop mix and system
- Can hit the malting barley spec. So no premium markets except milling oats
- No combine drilling, a negative impact on spring cereals?

## **Precision Farming Overview**

See Appendix 1 for a diagram showing the summary overview of precision farming

### **Soil sampling**

- Most of the farm now been sampled by Soil Essentials
- 4 pH samples every Ha
- P & K samples over wider field areas
- pH ranges from 5.4 – 7.0 have been found
- Phosphate mostly medium to high
- Potash mostly low to medium
- Albrecht soil sample taken from 1 heavy field to look at soil balance

### **Soil Conductivity**

- A couple of fields scanned to provide maps for variable rate seed

### **Variable Rate seed**

- Demonstrator Horsch drill used in spring 2012 to sow seed variably
- Problems with compatibility of boxes so did seed rate trial strips

### **Variable rate fertiliser**

- New Amazone fertiliser spreader in 2012
- Spreading variable P & K straights where required

### **Crop Sensors**

- Scanned a few fields in 2012, one was the spring barley seed rate trial, the other a wheat field with a compost trial
- Sensor used was a Fritzmeier Isaria which is a new sensor on the market
- Yara N-Sensor (non ALS) was trialled in 2013 with mixed results – very mixed backwards crops not 'normal'?
- Scan maps were a good insight into where yield would follow

### **Yield Mapping**

- New Holland combine has been yield mapping the farm since 2008
- Yield data being gathered but not currently being used for variable off-takes or target sampling

### **Autosteer**

- 2008 John Deere 7530 fitted with Greenstar SF2
- Autosteer used for sowing and other cultivation work
- Signal can be unreliable, Andrew looking at the following options:
  - Upgrade to newer JD receiver?
  - Upgrade to Trimble system?

### Conclusions so far

- Soil sampling working effectively
- Questions over applying Phosphate variably on the soil surface (lock-up)
- Jury is out on the N-sensor – high price not to work reliably in every season
- Next stage is to try variable rate seed, big interest for Andrews variable soils
- Yield mapping – want to try and make best use of data
- Autosteer very good when working but needs competent owner to set up and use correctly

### Yara Nitrogen Response Trials (Jez Wardman)

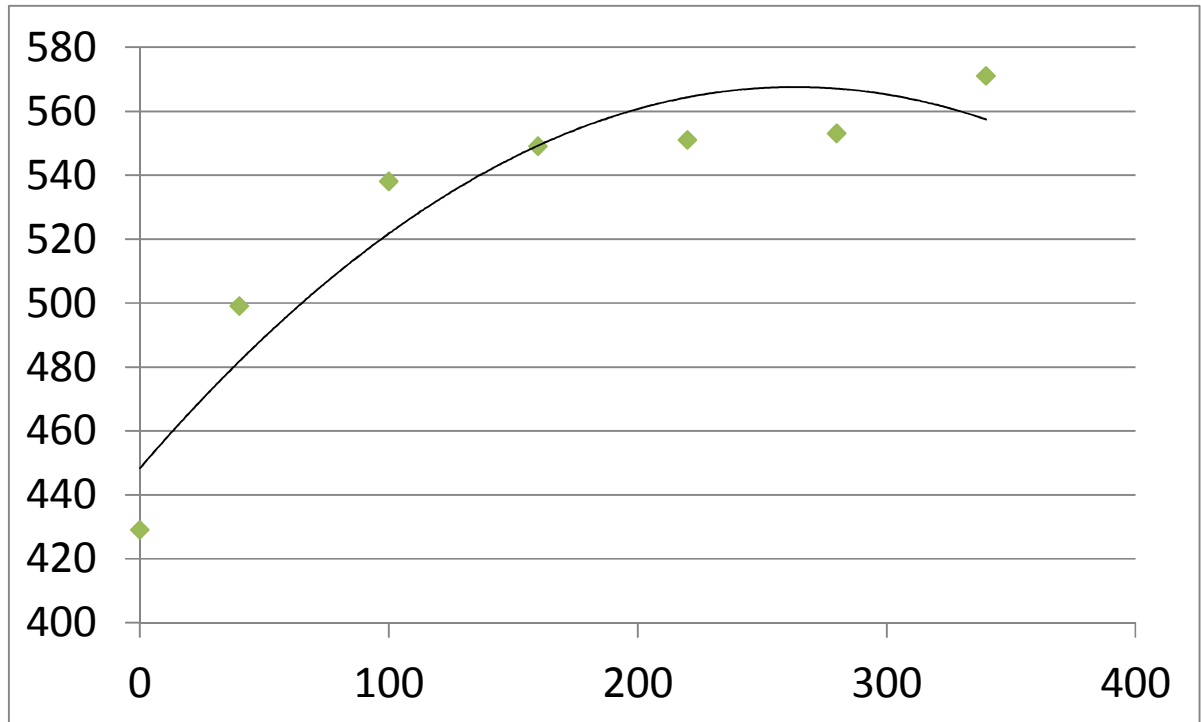
#### Trial Objectives

- To investigate the nitrogen response in winter wheat and winter barley
- To investigate the response to different splits at the first timing

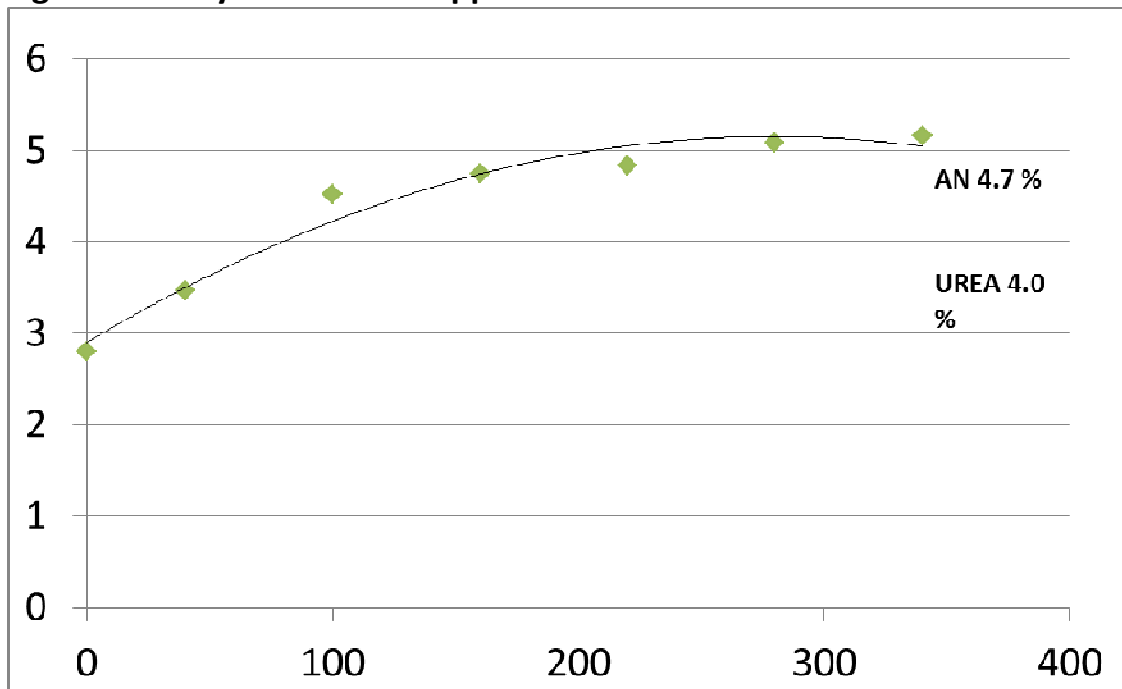
#### Treatments

Extran 33.5%	Application schedule (Kg N/ha)			Total N (Kg N/ha)
	1 <sup>st</sup> March	1 <sup>st</sup> April	1 <sup>st</sup> May	
1	0	0	0	0
2	40	0	0	40
3	40	60	0	100
4	40	80	40	160
5	40	100	80	220
6	40	120	120	280
7	40	150	150	340
8	70	100	50	220
9	100	100	20	220

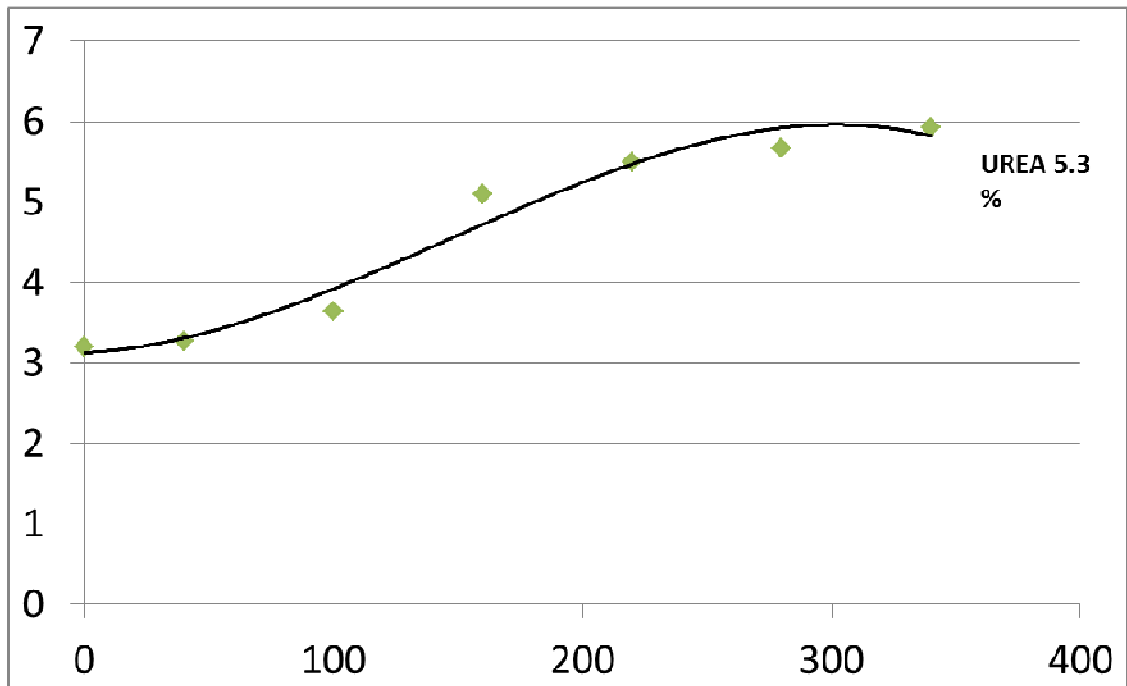
**Fig 1: W Barley - N Tester vs Applied N 10-05-13**



**Fig 2: W Barley - Leaf N% vs Applied N 10-05-13**



**Fig 3: W Barley - Leaf N% vs Applied N 04-06-13**



# Precision Farming Guide

## Goals

### GPS Soil sampling

- From 1 sample/ac to 1 sample/ha
- Number of companies offer this service
- Repeat around every 5 years
- Aim is to find and correct imbalances

### Variable rate lime/fertiliser

- pH is the most variable part of Scottish soils
- Can address with variable rate bulk lime or regular granular lime applications (Calcifert)
- Use straights to apply P & K
- Feed crop correctly

Correct variability and improve crop performance

### Soil conductivity

- Sensor pulled along field surface to identify soil changes across the field
- Produces an electronic map of changes
- Identifies changes at two levels, top and sub soil
- Only needs to be done once

### Variable rate seed

- Can alter seed rate across a field to match in with particular soil types
- Needs farm knowledge to work best
- More seed in heavy bits?
- More seed in light bits?
- Map then created to go into drill computer

Improve uniformity of crop and increase average yield

### Crop sensing

- A number of sensors are now available to attach to machines driving through crops
- These sensors are either controlling an application device or gathering data to be used at a later date

### Tractor sensors

- Most commonly used to vary nitrogen applications
- Can also scan the 'biomass' of the crop
- Some different types of sensor

### Satellite sensors

- Offers a pay as you go service, cheaper than sensors
- Is limited by cloud cover to take pictures
- Low resolution as very far above the field

Make efficient use of inputs and improve uniformity or manage variability

### Auto-steer/guidance

- A number of sensors are now available to attach to machines driving through crops
- These sensors are either controlling an application device or gathering data to be used at a later date

### Controlled Traffic Farming

- Use strict traffic lines within fields to run on as little soil as possible
- Need to match machinery widths in multiples, 6m, 12m, 24m, etc
- Cuts down compaction and improves soil structure

### Machine telemetry

- Combines that can control the tractor alongside to fill the grain trailer
- Machines that can be tracked and remotely viewed from the office to track performance
- Remote access used by dealers to diagnose and solve problems

Input savings, improve soil structure, reduction in driver fatigue

### Yield mapping

- A number of sensors are now available to attach to machines driving through crops
- These sensors are either controlling an application device or gathering data to be used at a later date

Management tool for crop offtakes and soil sample target areas

