

Talking Food vs Fuel

Throughout the 20th and 21st centuries, the global demands for energy and food have been relentlessly driving higher as the world population increases. Although the price of crude oil has recently fallen bringing the price of “energy” down, it is only going to be a temporary blip. The long term view indicates prices will rise again, putting pressure on how we produce and use that energy. This in turn will have a direct impact on our world – affecting climate change, land use and driving technology to find alternative ways to capture energy. This was the subject of the key address at the Hutchinsons Agronomist Conference (February 2015) where Tom Heap chaired a session looking at land use in relation to food and fuel production.

Asking the question of the audience “Should more land be given over to the production of fuel rather than food?” Tom invited four experts to present their opinion, each drawing on their field of experience and knowledge to support their argument.

Dr Nina Skorpuska (CEO Renewable Energy Association) reviewed the status of the UK Renewable Energy Action Plan, which set out how the Government plans to meet its 15% share of the overall EU target of 20% of total energy from renewables by 2020. Although progress is being made (UK at 5.2% towards 15% target), Nina indicated it will require considerable drive and commitment to hit the 2020 target, especially as the interim assessments show a lag which will be difficult to make up.

To fulfil that commitment there will need to be increases in all forms of renewable technologies deployed to generate energy, including the use of land to grow crops that are destined for fuel use – food and fuel, not food versus fuel.



“We cannot continue to use fossil fuels as we currently do – this will promote further climate change and global warming – otherwise we shall exceed the 2°C ceiling that scientists indicate is as much as we can allow the world to warm,”

Dr Skorpuska advised.

Will Dawson (Forum for the Future) stated that land can be used for food and fuel and both uses can support each other if we plan energy schemes smartly. He highlighted the Farm Power consortium’s findings that at least 10GW of renewable power could be installed on UK farms in this way.

Will gave the examples of solar PV installed within arable crops and used to enhance biodiversity and crop pollination, whilst restoring flower meadows. Additionally wind and solar can also be installed within livestock enterprises, with grass grown for grazing between the banks of panels – allowing for dual use of the land. He also promoted the use of anaerobic digestion for the conversion of slurry into energy and digestate for field fertilisation.

(photo above, Copyright: Belectric).

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HUTCHINSONS

Crop Production Specialists



Speakers and discussion group:

- Will Dawson (Forum for the Future)**
- Dr David Styles (Bangor University)**
- Dr Nina Skorupska (Renewable Energy Association)**
- Tom Heap (TV & Radio Presenter)**
- John Pelham (Andersons Midlands) and David Young OBE (TGE Group)**

>>> **David Young** OBE (TGE Group) took a very practical view, gained from the experience of installations of solar PV, ground source heat pumps and biomass boilers on several farms and other industrial units.

“Produce the energy locally and use it where you have harnessed it”, David advised. **“There are huge areas of roof space on farm and on industrial units where solar PV can be installed, without using any land. Even with today’s lower generation tariffs (currently 10.34p/kWh vs 2011 @ 32.9p/kWh for a 100KWp system), the newer, cheaper and yet more efficient technology can allow systems to cover their cost of installation within 6 years.”**

If necessary land could be used for solar PV – but take out unproductive land on the farm first, so fertile land is preserved. For biomass boilers the fuel source could be from better managed woodland already existing on the farm, with coppicing and planting to replace trees and delivering environmental benefits. Ground source heat pumps have very low impact, are an extremely efficient heat source and can even be run through lakes as the energy source.

Dr David Styles (Bangor University) applied scientific analysis and measurement to the differing technologies, indicating where the greatest savings in greenhouse gas emissions would be delivered and also which would represent the most efficient use of land (see Table 1, right).

“All these technologies are able to deliver useful forms of energy (gas, electricity, heat), but some are significantly more efficient than others. Wind turbines occupy the smallest area of land per unit of energy generated, and solar PV installed on buildings or even in fields appears to be very efficient. However, strategic use of crops for biofuel can be advantageous to the farm and the environment,” comments David. **“Placing willow for coppicing adjacent to watercourses to provide a buffer that protects water from fertiliser run-off and soil erosion delivers dual benefits. A combination of the various options could deliver maximum benefit – establish the appropriate energy crop or mechanical technology in the right place to deliver our energy needs.”**

From the many topics covered in both the presentations and the discussion, a number of key points clearly stood out:-

- We (the global population) must put a ceiling on our use of fossil fuels for heating, transport and electricity generation and move to alternatives that do not contribute to greenhouse gas emissions
- Although there are a range of options to choose from, the most effective for greenhouse gas emission reductions are achieved by wind turbines and solar panels, plus both technologies are the most productive for energy generation per unit of land area they occupy
- The latest generation of solar PV and wind turbines are extremely exciting technologies and can make a huge contribution to energy production, without consuming land upon which food could and should be grown
- Farm installations of solar PV, woodchip/straw briquette burners or ground source heat pumps are ideally suited to meet individual farm needs – make energy locally and use it locally
- Crops can be used for fuel production but they must be matched to the location and local need in order to justify their installation e.g. AD plants – ideally using mostly waste material to feed the digester and topped up with crop material to maintain consistent biogas production.

Summing up, Tom reminded the audience that growing food for fuel is not a new idea – in the past two centuries when land was tilled by horse-drawn implements over 30% of that land grew crops to **“fuel the horses”**. The demands of the world have changed significantly since those times, but with inventiveness and technological advances there will be many new and more effective ways that energy can be harnessed with much less impact on the world in which we live.

Renewable Energy Option	Primary energy replaced (MWh/ha/yr)	Net (life cycle) GHG mitigation (t CO ₂ e/ha/yr)	
		No ILUC	ILUC
Maize biogas CHP elec. only (13.5 t DM/ha/yr)	32	-1.3	11.4
Maize biogas elec. & heat use (13.5 t DM/ha/yr)	50	-6.2	6.5
Oil seed rape biodiesel (3.3 t seed/ha/yr)	8.3	-0.5	6.3
Miscanthus heating (12.6 t DM/ha/yr)	72	-21.5	-9
Wind (per net ha used)	3000	-396	-383
Solar PV (Wales)	1063	-141	-128

Table 1. Data from David Styles – Bangor University
 GHG = Green House Gas ILUC = Indirect Land Use Change
 t CO₂e/ha/yr = tonnes of CO₂ emitted per hectare land per year (life cycle basis)

Fieldwise Nutrition

Tim Kerr (Hutchinsons Fertiliser Manager) looks at two essential elements, potash and nitrogen, which can limit crop yield potential when they are in short supply.

Spot the connection?

Growing crops successfully means capturing the energy of the sun via photosynthesis. The food produced as a result is a source of energy, whether it is destined for humans, animals or machines.

A PV cell is essentially doing the same job, only it doesn't require fertilising, although the 'seed costs' are rather higher than farmers are used to.

The increasing number of fields in the UK that have been given over to generating solar energy via photo-voltaic (PV) cells has fuelled the debate on whether it is an appropriate use for productive agricultural land.

Meanwhile researchers at Cambridge University are exploring the potential of something called photo microbial fuel cells – in simple terms generating electricity directly from potted plants – which transform sunlight into electricity.

Effectively capturing natural resources – light and water – will in a large part define how successful growers are. This is a major cornerstone of agronomy.

Whilst the weather is out of our control, providing appropriate crop husbandry can make a crucial difference – from seedbed preparation all the way through to storing the harvested crop.

In this instance we focus on the importance of crop nutrition in maintaining and maximising the crop potential.

To maintain that potential it is important to avoid any of the essential elements becoming a limiting factor, as any of these elements, vital to plant growth, can limit yield when they are in short supply.

Potash

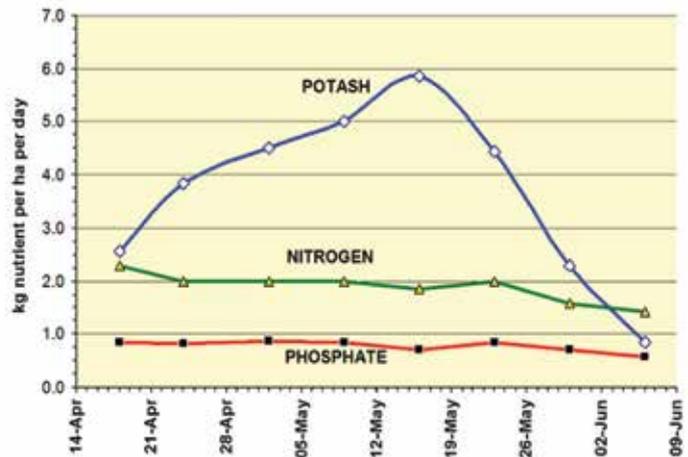
The importance of potash in maintaining a strong, healthy plant – with the ability to intercept the maximum amount of sunlight – can sometimes be overlooked. Potash is essential in maintaining turgidity in plant cells – which has a direct impact on the ability of a leaf to capture sunlight. Arable crops require more potash than any other nutrient over the next three months. A significant portion of this is returned to the soil later in the season, and as



a result the crop *requirement* is not always met when the focus is solely on the crop *removal*. Soils below index 2 for K consistently underperform, unless adequate potash is applied. According to RB209, wheat yields have been over ½ tonne per hectare less at index 1 where no K has been applied to the crop.

It is not too late to apply potash now and still maintain yield potential. Peak uptake is through April and May – more than double that of nitrogen as shown in Figure 1 below – and reaching 6kg per ha per day at its highest point in May.

Daily uptake of nutrients by wheat, first node to flowering



Source: Potash Development Association (PDA)

Figure 1

Nitrogen this spring

If we were living in an ideal world and could assume that there were no other elements limiting a crop's growth, then how are we to evaluate the correct nitrogen rates this year?

The typical spend on nitrogen on Winter wheat and oilseed rape in 2015 will be in the region of £150 per ha – the single biggest input cost. In order to judge more precisely what to apply, and therefore to use more or less nitrogen according to demand, some understanding of what the soil will be able to supply will be an important aspect in decision making.

NMin testing can not only measure the currently available nitrogen, but will also provide an estimate of the potentially available nitrogen that should become accessible through the season. This can allow nitrogen rates to be tailored accordingly. It is still possible to take NMin samples this spring – speak to your adviser to discuss where this might be of most benefit.

Results in so far suggest that the pool of available N is variable depending on several factors including soil type and previous cropping. On similar medium soil types the difference in the available nitrogen pool is up to 90 kg per ha. The resultant recommendations will reflect these differences – aiming to maintain consistent yield potential without over fertilising. Bear in mind the good growing conditions last year encouraged both soil mineralisation and crop uptake, whilst variable rainfall patterns will make unmeasured assessments even more prone to inaccuracy.

Other factors such as the expected yield potential and specific market requirements (e.g. milling wheat protein standards) will also need to be taken into account. Layering up and quantifying such information requires a practical system of interpretation in order to provide quantifiable benefits to the grower.

Omnia – recently launched – does exactly this. Omnia Nutrition can interpret information from a whole range of sources such as soil and yield maps and provide individually tailored in-season fertiliser recommendations; either by field or broken down to management zones within fields.

So, whilst charging you iPad using the pot plant on your windowsill remains a pipe dream, the next generation of crop husbandry support certainly is with us now.

For more details visit www.omniaprecision.co.uk



Fieldwise SEED NEWS

This month, Colin Button (Hutchinsons Seeds Manager) discusses different approaches to cover cropping and offers some thoughts when planning wheat variety selection for 2015-16.

Cover Crops

The subject of 'Cover Crops' is a broad one, and we see three quite different approaches from growers, each with different requirements:-

1. Fulfil the requirements of the recent CAP Reform rules by putting in a cheap cover crop post-harvest, and leaving the crop in the ground until the following January 31. This is low cost, and can be destroyed easily.
2. Gain real benefit by restoring soil "health", soil structure and Organic Matter, and also potentially limit soil erosion as well.
3. Add to the soil benefits in 2 (above) through a potential impact on soil pests and diseases, such as reductions in Potato Cyst Nematode (PCN) and Beet Cyst Nematode (BCN).

The likely costs of the above options would increase as you move from 1 – 3.

Options 1 and 2 are relatively easily achieved and would be simple combinations of 2 species, one cereal and one non cereal (Oats and Mustard as an example).

Alternatively, a more diverse mix such as Oats with Radishes, Vetches, Sunflower or Phacelia, would improve the root "architecture" and bring the positive effects that this can exert in the soil, where structural problems currently exist.

The erosion of soils is an area of increasing concern, especially where maize is grown on light, erosion prone soils and on slopes close to water or roads. Last year Hutchinsons demonstrated the successful establishment of a cover crop sown into standing maize at the 6 – 8 leaf stage, using a grass and vetch/clover mix. This mix will now be offered by Germinal and Hutchinsons for the 2015 crop. (See picture, right).

Introducing the more complex mixes, where soils are less accustomed to the different species, is not always as easy as it might seem.

Successful establishment requires these mixes to be set with some attention to detail, just as if they were a commercial

crop – especially where the seed mix might be costing £50 - £60 or more per Ha.

The 3rd option in the list is worthy of some care too, as species of cover crop that might be selected can actually provide a negative effect to the following commercial crop; for example the unwitting increase of Flea Beetle in a Vegetable Brassica crop rotation by the use of mustards/radish in a summer fallow cover crop.

The effect of the cover crop on the PCN and BCN problem is also likely to be variable and will depend on soil temperature and moisture when the cover crop is incorporated – remembering that there are two quite different effects that the cover crop can offer.

1. Fumigant from the breakdown products of the brassica plants; isothiocyanate (ITC)
2. Life-Cycle interruption – encouraging egg hatch of the nematodes, then removing the food source

These are the more expensive options and certainly carry the greatest requirement for specialist agronomy advice.

A further caution for choice of species in a short term cover crop would be – carefully think about how you will destroy it before the next crop, to prevent seed set and introduction of unwanted "weed" issues for the future.

Hutchinsons would be pleased to offer advice on this, at a local level, through any one of our national network of agronomists.

WHEAT VARIETY SELECTION FOR 2015-16

Six new wheat varieties enter the 2015-16 HGCA Recommended List and below are some thoughts, as you look ahead to autumn 2015 drilling.

KWS Trinity	Gp 1 Milling	UK Yield 102
KWS Lili	Gp 2 Milling	UK Yield 105
Britannia	Gp 3 soft feed	UK yield 104
RGT Conversion	Gp 3 soft feed	UK yield 101
Reflection	Gp 4 hard feed	UK yield 107 (Highest on the List)
Costello	Gp 4 hard feed	UK yield 104

An interesting point to make is that **REFLECTION** is the highest yielding variety on the list – at 107. Ordinarily, many growers will focus on that as the 'barn filler', as has been the case with Oakley, Santiago and Kielder. REFLECTION has its place to take in the farm plan – consider yield, specific weight, the disease resistance package and Blossom Midge resistance. Take a look at this in the trials line up this season.

Then again, we have **KWS LILI** at 105 yield, just 2% points off and with the average 'Least significant difference' (LSD) 5% set at 3.5%. In other words, those varieties within the 3.5% difference are all pretty similar in their likely yield performance.

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Grass and vetch/clover cover crop mix in maize



>>> However, in this case we have a Group 2 milling variety. This variety is noteworthy – High yielding with good specific weight, very good disease resistance package, and excellent lodging resistance and as a group 2, chance of a premium depending on market and year. Thus, a possible win – win situation, with a different way of looking at variety selection, by merit.

KWS TRINITY - the new entrant group 1 milling type alongside Skyfall, will give growers a second option. Very high Hagberg but no Blossom Midge resistance, yields are equal. Plentiful seed supplies of both varieties this year.

BRITANNIA - a group 3 type, will be assessed this year in our trials around the country

RGT CONVERSION – interest here in the north for distilling. Limited seed availability. Could be one to watch as its market expands.

COSTELLO a hard group 4 – will see a limited seed release in 2015. High specific weight and Hagberg might make this a variety to look at in the west, along with JB Diego, with good disease resistance. In the wet year of 2012, this variety held on to its quality.

Growers will be able to view these varieties demonstrated at Hutchinsons Regional Technology Centre sites around the country during this spring and early summer. Open day dates will be published in due course.

Please consult your local Hutchinsons group agronomist, or our dedicated seed specialists, who will be happy to assist in selecting suitable varieties for your own individual situation.



Planning Potato Planting

Darryl Shailes (Hutchinsons Root Crop Technical Manger) looks ahead to the potato planting season and outlines the factors that need to be considered for successful establishment.

Potato planting will be soon be under way for most, with the early growers in Cornwall and on the Suffolk coast already putting crops in under plastic.

There are several factors we need to consider in the build up to the planting season:

Seed management is a key feature at this time of year. Hutchinsons' potato agronomists have been developing a good understanding of this issue and last season ran a training course at Sutton Bridge where experts from the Potato Council led the session. Various different seed lots were assessed for disease, size etc. and then different strategies were discussed for managing the seed, up to and including planting. The session was very much 'hands-on' and gave our agronomist team a good insight into this important area to help their growers.

Another thing to consider and a topic very much on the Potato Council's radar is **soil management** at planting.

Mark Stalham at CUF/NIAB has done extensive work on this over the past few years on behalf of the Potato Council and spoke at our own internal Potato Conference last year, to update all our potato agronomists on his work. He has shown in his work how different soil management strategies can have a huge effect on yield and costs and we are encouraging our growers to adopt these ideas.

On a similar theme, Hutchinsons are involved in a project to look at **EMR scanning** to see if the information it generates can help with soil management in the potato crop this spring. A UAV is flown over the crop to map the canopy at various times in the season and a yield map is taken at harvest to see if there are any relationships shown.

Going over the **PCN maps** and deciding on treatment and variety choice is also an important task at this time of year. It is very important that the operators of the granule applicators have attended one of the new

Nematicide Stewardship Programme (NSP) training courses, to ensure all of the new measures are put into place.

Physically planting the potatoes is now planned like a military operation, with various different treatments being applied at the same time. As well as ensuring the seed is at the correct depth and spacing, other elements such as seed treatments, in-furrow treatments and fertiliser are also being applied at planting; therefore set-up and attention to detail at planting plays a huge part in the successful potato enterprise.

One in-furrow treatment Hutchinsons has been exploring in recent years is the use of **'Primary P'**, a micro-granule starter fertiliser that can go through a standard micro-granule applicator. Good results have been demonstrated in terms of canopy development and yield and, this season, we are continuing to investigate 'Primary P' at our trial farm in Norfolk, dedicated to soil improvement and crop nutrition – 'FENCE'.

Another interesting product we are looking at is **'Transformer'**, a soil treatment that has an effect on the water infiltration rate in difficult soil conditions. In collaborative work with the 'James Hutton Institute', initial results have been encouraging and again it will be featured in our trial work at our FENCE farm and elsewhere this coming season.

Once the crop is in the ground, for the first time in a number of years we have a new herbicide to add to the armoury. It is widely known that Linuron will not be available much longer, but newly approved Metobromuron will more than fill the gap. We have looked at **'INIGO'** (as Metobromuron will be called) over a number of years and across a range of soil types and we are very excited about this new product.

'INIGO' will bring some additions to the weed control spectrum over Linuron and is also very safe - in all our trials, even on the sandiest of soils and across a range of varieties; we have had excellent crop safety.

In conclusion, whilst it may be a quiet time on the farm for some, potato growers have a huge amount to be thinking about, so let us hope for a good planting season to start the growing programme off successfully.

Precision Agronomy Conferences

Farmers from across England have been hearing about the potential benefits of precision farming and better market knowledge, in a series of conferences organised by crop production specialists, Hutchinsons and Gleadell Agriculture.



Nick Strelczuk
Hutchinsons Precision Technology specialist



Farmers in the UK are well positioned to take advantage of precision farming, according to Shropshire farmer **Andrew Williamson**, who farms 900 acres near Bridgnorth.

Mr Williamson, a Nuffield Scholar who visited some leading proponents of precision farming around the world during his studies, has used soil and yield maps to target nutrients on his farm for several seasons and introduced variable rate drilling in 2013.

"UK agriculture is perfectly situated to widely adopt precision farming," he told the conferences. "Unlike some parts of the world we have a long growing season that gives us time to measure what is happening and make adjustments."

To do that effectively growers needed access to high quality data, he added. "Precision farming is not just about pretty pictures. You need to ensure the data is meaningful and relevant to your business to make proper informed decisions. It has to be based on good agronomy.

"In addition that data needs to be available across all platforms, so you can move it around in an efficient manner and use it to its full advantage. It won't make a bad farmer into a good one, but it can make a good one better."

Echoing Mr Williamson's observation, **Oliver Wood**, Hutchinsons' Precision Technology manager, said good quality information was paramount. Without it, yield maps were just expensive wallpaper.

"Yield maps are the commonest precision farming tools, with about 40% of farmers saying they create them. But about 80% of those don't do anything with them, or do so only occasionally. There is clearly a problem."

However, in the right hands yield maps could show clearly which parts of fields had the most potential. To ensure yields were correctly recorded, careful calibration was important and accurate driving was a must, though autosteer was helping here. Yield recording needs to be switched on and off at the right time at headlands to avoid false readings.

Yield maps were most commonly used to calculate phosphate and potash offtake to

ensure the right amounts were replaced, using a variable application spreader.

Maps could be used in more sophisticated ways, identifying yield trends over several seasons within fields, which agronomists and growers could then investigate. That required skill and good knowledge of the farm, but added value to data, he said.

"This way you can start to build a picture of what is going on in your fields."

Now, clever software being developed by Hutchinsons and supported by Gleadell Agriculture can help to build this picture, said **Nick Strelczuk**, Hutchinsons Precision Technology specialist.

Omnia is a fully integrated management tool that can gather information from a multitude of sources, such as soil and yield maps, satellite imagery and weed and pest maps that farmers can create themselves.

This enables historical and current data to be analysed and built into variable rate application plans, he explained. "Omnia can multi-layer this data, to enable intelligent and informed decision making on the full range of variable applications."

The system can significantly reduce input costs, improve yields, help farmers meet environmental objectives and improve machinery use, he added.

Omnia has been three years in development and will be fully launched later this season.

Chris Wood, oilseed trader and analyst at Gleadell Agriculture, then gave farmers attending the seminar a fresh insight into managing risk when selling their grain, including the tools used by market analysts to predict grain market movements and help improve profits.

"Human beings move markets – they decide whether to buy or sell," said Mr Wood. "When operating in financial markets they constantly make the same decisions because they come under the same emotions. That is reflected in price action – you constantly see the same shapes and patterns appearing on price charts."

Mr Wood highlighted the need for better risk management and concluded that growers need to consider what time period they were selling and why, and



Oliver Wood
Hutchinsons Precision Technology Manager

their price risk, then talk to a merchant with international connections who can identify market-changing factors before they become news.

Andrew Williamson stated that Precision farming is often perceived as high cost and therefore suited to large, all-arable operations. However, he believed smaller farms stood to gain as much or more than their larger counterparts, especially as they tended to run smaller, narrower machines. This meant they stood to gain more from autosteer, which eliminated overlaps. "And there are opportunities for grants, with more funding coming forward."

Oliver Wood pointed out that many farmers owned machines that were already capable of variable applications, though they may not realise it. Combines could also be retrofitted with the technology for a few thousand pounds, enabling them to create yield maps.

For more information regarding Omnia Precision Agronomy, please contact your local Hutchinsons agronomist.

For more information on any of our products or services please contact your local Hutchinsons agronomist or contact us at:

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