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Landwards

SOIL

CARING FOR NATURE'S GREAT PROVIDER

In this issue

IAgrE

Biosystems Engineering

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IAgrE

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The Managing Editor of Biosystems Engineering, Dr Steve Parkin, has kindly summarised a selection of the papers published in the last three issues which he thinks will be of interest to IAgrE members.

Biosystems Engineering

Volume 157, May 2017, Pages 92-98

Research Note:
A multi-Kinect cow scanning system: Calculating linear traits from manually marked recordings of Holstein-Friesian dairy cows

JenniferSalau, Jan H.Haas, WolfgangJunge, GeorgThaller
Institute of Animal Breeding and Husbandry, Christian-Albrechts-University Kiel, Germany

Microsoft Kinect systems have already been used for detecting lameness and determining body condition in dairy cattle. A combination of six Kinect cameras was used with the goal of measuring linear descriptive traits. To access the precision of measurements gathered with a fixed installed recording unit, front teats and ischial tuberosities were marked manually in the recordings. Teat lengths and heights of ischial tuberosities were then calculated from the 3D coordinates. Recorded with cattle standing still and walking, teat lengths showed a standard error range from 0.7 mm to 1.5 mm and 1.8 mm–3.2 mm, respectively. The standard errors regarding the heights of the ischial tuberosities ranged between 2.4 mm and 4.0 mm in standstill and between 14.0 mm and 22.5 mm when measured on a walking cow.

Biosystems Engineering

Volume 158, June 2017, Pages 110-133

Modelling of micrometeorology, canopy transpiration and photosynthesis in a closed greenhouse using computational fluid dynamics

Thierry Boulard, Jean-Claude Roy. Jean-Baptiste Pouillard, Hicham Fatnassi, Ariane Grisey
INRA, University Nice Sophia Antipolis, Sophia Antipolis, France
Institut FEMTO-ST, CNRS, University Bourgogne Franche-Comté, Belfort, France
CTIFL, Centre de Balandran, Bellegarde, France

Closed greenhouse systems allow micrometeorological conditions to be optimised for both energy saving and high quality yields. However, micrometeorological parameters need to be accurately monitored as a response to daily environmental conditions changes. A Computational Fluid Dynamics (CFD) model was developed to predict the distribution of temperature, water vapour and CO2 occurring in a Venlo-type semi-closed glass greenhouse equipped with air conditioners. Sensible and latent heat fluxes in the crop rows were included in the model along with radiation through a Discrete Ordinates (DO) model. A model for photosynthesis was also included to predict the evolution of the CO2 concentrations inside the greenhouse. Comparisons between simulated and measured values showed a good agreement for temperature and humidity. Good agreement was found also between simulated and experimental CO2 concentration values determined during a sunny summer day.

Biosystems Engineering

Volume 159, July 2017, Pages 59-69

Biofiltration of exhaust air from animal houses: Evaluation of removal efficiencies and practical experiences with biobeds at three field sites

Roland W. Melse, Johanna M.G. Hol
Wageningen University & Research, Wageningen, The Netherlands

Three wood-chip based biofilters ('biobeds') were monitored during 6–12. Average ammonia (NH3) and odour removal efficiencies per site were 38–74% and 43–62%, respectively; a large variation was found between measurements. Poor moisture control of the packing material decreased these efficiencies (breakthrough). It is concluded that biofilters have potential for emission reduction at animal houses, but especially high pressure drop (clogging/fouling) and homogeneous moistening of the biobed need attention. To prevent breakthrough of air at dry spots, it is recommended to increase the media depth. Further research is necessary to explore the conditions and parameters that influence N_2O production in this type of systems, as currently no control strategy is available for preventing N_2O generation.

EDITORIAL: SCRATCHING THE SURFACE

THOSE of you of a certain age will recall the popular BBC radio series from the 1950s and 1960s ***Beyond our Ken*** hosted by Kenneth Horne. One of the regular characters in the show was Arthur Fallowfield, based around a well-known Wiltshire farmer and broadcaster Ralph Wightman and played by Kenneth Williams. Whatever the sketch, whatever the line fed to him, Fallowfield's reply always started with the phrase "Well, I think the answer lies in the soil".

Although the origins of soil science are reputed to date back to a German chemist Justus von Leibig in the mid 1800s, a Russian Vasily Dokuchaev is widely regarded as being the 'father' of soil science as we know it today. He created the Russian school of soil science which developed a new concept of soil. Soils which were independent natural bodies, each with unique properties resulting from a unique combination of climate, living matter, parent material and time.

Not that a character in a radio programme during the mid-1950's would have necessarily appreciated the complex composition of soil in an age post-war when we were striving to feed our own nation, let alone a growing world population.

In our feature on Soil in this issue, we can only scratch the surface of probably the most unsung, unheralded and unappreciated qualities of one of the world's natural resources. How could we possibly do full justice to areas such as pedology, biology, chemistry, physics, geography, erosion, hydrology and carbon sequestration? The soil science community recognise that much of their work goes on 'below the radar', yet there is obvious frustration that there is, for instance, little or no national policy on soil quality. There are few votes in agriculture, let alone soil science. However, a recent Commons committee did describe soil as a 'Cinderella environmental issue that received much less attention than air or water pollution, or climate change'. Let's hope that action goes further than mere words.

All of which is a convenient preamble to our unmissable Conference in October which will focus on carbon, and the role soil must play in its capture.

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OTHER FEATURES

LANDWARDS PRODUCTION TEAM
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MEP LAUNCHES FARM TECHNOLOGY REPORT

A far-reaching report which details how developing technology can advance farming was launched at the Royal Three Counties Show in Malvern, Worcestershire.

MEP Anthea McIntyre, a member of the European Parliament's Agriculture and Rural Development Committee, is publishing the report following extensive consultation with a range of experts from the fields of science, academia, horticulture, arable and livestock farming, land management, ecology and politics.

She presented a copy of the report to the new Secretary of State for Environment, Food and Rural Affairs Michael Gove.

Technological Solutions for Sustainable Agriculture builds on her parliamentary report, adopted by MEPs last year, and sets out a range of recommendations for making technology at the heart of agriculture in the EU to boost productivity and protect the environment.

Key evidence was gathered at a recent round-table conference last month in Ross-on-Wye, Herefordshire, and in reports from John Chinn, Chairman of the UK's Centre for Applied Crop Science, and the Vice Chancellor of Harper Adams University David Llewellyn.

Miss McIntyre, Conservative MEP for the West Midlands, said: "Nothing is more important to mankind's future than agriculture and how we feed an ever-growing number of hungry mouths across the globe. And nothing is more important to agriculture's future than the serious but sensitive application of new technology, chemical and genetic innovation and the harnessing of emerging digital, biological and physical science.

"Our widespread consultation highlighted many key opportunities including increased use of robots and drones, driverless tractors, more-accurate application of pesticides and better rural broadband. Deteriorating soil quality and reduced nutritional qualities in food were among the challenges flagged up.

"I believe our recommendations can play a major part in pushing the advance and harnessing of technology to the front of the agriculture and policy agendas."

ABOVE RIGHT: Anthea McIntyre and Michael Gove

SOUTH STAFFORDSHIRE COLLEGE OPENS £5.4M AGRI-STEM ACADEMY

SOUTH Staffordshire College has officially launched its £5.4m AgriSTEM Academy, which aims to address the fundamental economic and food security issues facing the farming community.

The facility will provide market-leading and innovative training opportunities for the agri-tech and Advanced Manufacturing and Engineering (AME) industries.

The Academy is situated at South Staffordshire College's Rodbaston campus, and will offer a new range of diplomas, apprenticeships and traineeships in subjects such as Landbased Engineering, Agricultural Engineering, and Motorsport. Its first intake of students will start in September.

The new venture features an agri-tech precision farming engineering lab, and agricultural engineering workshops.

The offering to students was discussed in the context of many of the major issues confronting agriculture in post-Brexit Britain, such as the potential termination of EU subsidies in 2019, and the need for increased efficiency in food production.

Graham Morley, Chief Executive Principal of South Staffordshire College, said: "The unique combination of facilities and expertise on offer at AgriSTEM will place us right at the forefront of the national skills agenda. We will play a vital role in addressing the nation's food security challenges, tackling the economic cliff-edge facing agriculture, and enabling students to successfully pursue a career in the agri-tech or AME industries. Agriculture in particular faces a very different future from its traditional roots, and we have clear objectives in terms of how the academy will prepare learners for that.

"Looking forward, we want the AgriSTEM Academy to not only be a centre of excellence for skills, but also to be at the centre of national conversation on the issues facing UK agriculture today.

"The Academy provides a logical and natural home for that debate, and we look forward to welcoming industry professionals back to participate in those conversations."

The academy was funded by the Government's Local Growth Fund through Stoke-on-Trent and Staffordshire Local Enterprise Partnership. It will be opened by former Rodbaston student and Secretary of State for Transport Rt Hon Sir Patrick McLoughlin, who worked in agriculture before his political career.

SILSOE ALUMNI REUNITE AFTER 50 YEARS

A group of over 40 alumni from the 1962-65 cohorts of the National College of Agricultural Engineering met together on 18 July at the Star and Garter pub in Silsoe, Bedfordshire.

Silsoe alumnus Colin Meddow-Smith writes " It was the first time in over 50 years that many of the group had seen each other, and there was a wonderful nostalgic vibe on the day.

The National College of Agricultural Engineering at Silsoe welcomed the first intake of students in 1962. Initially at Boreham House, Chelmsford, it moved to its newly built facilities in Silsoe in 1963. At the time it was the only college in the UK that was focused on supporting the agricultural engineering industry and offered a full three-year degree level qualification.

Its success lead to its merger and integration into Cranfield University in 1975, becoming known as Cranfield University, Silsoe Campus. Silsoe successfully continued to expand and develop over the next 24 years before finally closing in 2009. The college was staffed by a group of young lecturers who were dedicated to ensuring that the NCAE was successful in its mission. They were led by an equally young and talented Principal, Dr Peter Payne, whose vision and dedicated leadership established Silsoe to become an acclaimed centre of excellence supporting the Agricultural Engineering industry.

In late 2016 a small team of former students from the early years explored the idea of a reunion. The focus was to be on the first four years intake, '62 - '65.

The Star & Garter was a popular haunt for students in those days, and it was a nostalgic return home. This was the first time for 50 years that many attendees had met since leaving college.

Some 50 former students, most in their seventies, plus wives and partners attended the all-day event. Alumni came from across the world... from the USA, Canada, Turkey, Thailand, Spain, Germany, France as well as the length and breadth of the UK. This speaks volumes for the high regard in which the NCAE was held. Also attending were surviving staff, again in their eighties.

The event was deemed to be a great success, with requests to have further meetings in the future. Plans are already being made to hold a similar reunion for the intake years of '66 - 69.

Perhaps the words of one of the lecturers best summarises the emotion of the day: "For the surviving staff and Dr Payne, it is extremely satisfying to see how all the students have progressed, recognising that this has been through their own efforts. All we as staff were able to do was to try to develop their interest and enthusiasm and give them a few basics to build on."

AGCO BUYS PRECISION PLANTING BUSINESS

AGCO has agreed to buy the Precision Planting equipment company from The Climate Corporation, a subsidiary of Monsanto.

"The acquisition of Precision Planting will solidify AGCO as one of the global leaders in planting technology and strengthen our position as a full line partner for professional farmers across the globe," said Martin Richenhagen, AGCO's chairman, president and chief executive officer.

The deal for the line of high-tech planting equipment came after Monsanto abandoned plans to sell the unit to John Deere after pressure from the US Justice Department on the grounds that the deal would suppress competition for seed-planting technology.

Deere has its own high-speed seeding technology, which it is installing on new planting equipment and selling in retrofit kits.

Precision Planting

ENGINEERING COUNCIL STRATEGIC PLAN

The Engineering Council has published its new Strategic Plan that will steer the organisation's work for the next three years, from 2018 to 2020. The plan, which was launched at the Engineering Council's 2017 Annual General Meeting (AGM) on 15 June, follows three clear aims: to provide public benefit, to maintain a globally recognised standard and to meet future needs.

Professor Chris Atkin CEng FRAes, who became Chairman of the Engineering Council at the AGM, said: "I am proud to take on the role as the Engineering Council's new chair as we prepare to carry out our new Strategic Plan. In collaboration with the engineering community, most notably the professional engineering institutions but also academics and employers, we will continue to ensure that those who become professionally registered with us are not only competent and committed to the profession, but are also able to work in an ethical, sustainable and safe manner."

Prof Atkin added: "As our industry strives to develop engineering education, increase apprenticeships and push for greater diversity and inclusion within the sector, engineering skills have never been more valued and sought after. It is therefore vital that the profession's regulatory model is kept fit for the needs of the future."

FARM DIVERSITY IS THE FUTURE

Diversity is the future of farming. More and more farms are looking at branching out into more than one area to establish multiple streams of income which will allow business to remain resilient in the current unstable economic times. **The Farm Business Innovation Show** which takes place on November 8th & 9th at the NEC in Birmingham is the event for farmers, land, and rural business owners to find the ideas, products, tools, and resources needed to diversify their land and property in order to increase their income.

Diversification opportunities are endless; dairy farms are keeping bees, arable farmers are growing miscanthus in areas with poor soil and installing solar panels, sheep farmers are opening livery stables. It's not just farms either, all kinds of rural businesses are expanding their revenue streams. Landowners are opening glamping sites, estates are hosting rock concerts, large country houses are opening their doors as filming venues. As technology continues to advance and fully integrate itself as integral in the world of agriculture, options to enhance, change, and develop will only continue to grow. The Farm Business Innovation Show is designed to deliver inspiration and the knowhow to make dreams you may never otherwise have thought of become a reality.

Along with the initial idea, the event also gives you what you need in terms of the actual logistics of how to make it happen. From planning permission and case studies, to grants and funding, you'll find everything you need from that first spark of an idea to the legal requirements, to the physical tools to make it happen, and everything in between!

Tickets to this inspirational event are free and you can register at www.farmbusinessshow.co.uk. Your ticket will also gain you full access into the events three sister shows, Country House Business Innovation, Holiday Park & Resort Innovation, and Family Attraction Expo.

Glastonbury Festival site

Michael Eavis is one of the speakers with his experience of hosting the Glastonbury Festival

NEW STUDENT AWARDS

IAgrE, in partnership with CNH Industrial has announced new, prestigious student awards, open to students in higher education.

The two awards are directed at undergraduates and post-graduates and will be made for a dissertation or thesis demonstrating innovation and practical application in the land-based industry.

"We are delighted to be partnering with CNH Industrial to launch this award. Over the past years, the Company has collaborated with us to sponsor the Johnson New Holland Trophy Award. This is an opportunity to raise the profile of the awards and reward the innovation and hard work of students in higher education", said Alastair Taylor, CEO of IAgrE.

"As a key player in the Agricultural Equipment sector, the future of our industry relies on nurturing the best possible engineers to design and build the products of the future. Our partnership with these awards strengthens this possibility", said Rob Alker, Current Product Improvement Manager at CNH Industrial.

The prizes are £500 for post-graduates and £250 for undergraduates. Both winners will receive a trophy for their respective universities to hold for one year, a VIP visit to the CNH Industrial Basildon Tractor Plant and internship opportunities.

Deadline for applications is 31 October 2017.

IAgrE STAFF CHANGES

Elizabeth Stephens has announced that she will be leaving IAgrE after more than 24 years. Her Finance and Projects role has already been taken over by Sabrina Sumpter. Elizabeth says" I would like to thank all members and staff for their friendship and support during my time as Finance Officer of IAgrE. It has been a privilege to work with so many dedicated and enthusiastic members, and I have certainly been infected with your passion for matters relating to ag-engineering! I will continue to work for the Douglas Bomford Trust and the AgriFood Charities Partnership so will still be involved in the sector and will be in and out of the office occasionally"

Meanwhile, Sally Wood has left IAgrE in order to concentrate on her flourishing gardening business.

Elizabeth Stephens

Sabrina Sumpter

TIMELY CONFERENCE

Focus on international innovation

President's Musings

IAgrE President
Dr ROBERT MERRALL
MIAgrE, EngD

This particular summer seems to have flown by in something of a blur but I am very much looking forward to our conference on the 11th October.

I do fear that in the UK we are in danger of having Brexit overshadow everything, including our environmental responsibilities, so I am really pleased that our forthcoming Conference will be a chance to examine some of the international innovation going on in this area.

I have tried throughout my presidency to tackle things from a commercial perspective, and there will be some unashamed commercial input to this conference. We will hear more about some of the developments in renewable fuel which I'm very proud to say Merralls Consulting has had a hand in making happen. In that vein we are delighted to have Carlo Lambro with us from New Holland to tell us a little more about the innovation needed to make their gas tractor project a reality which will anchor some important technology development work here in the UK.

As other sectors consider the widespread electrification of vehicles, in heavy haulage and large scale agriculture (certainly in conventional tillage applications), wholesale electrification is not really practical right now. With current technology, a li-ion battery for a tractor equivalent to a 150 litre diesel tank would weigh around 3 tonnes and cost in the region of £90k. That is not to say that this technology won't get better, and we cannot ignore the fact that there are significant efficiency benefits in the electrification of implements. Nor can we insist that all agriculture revolves around big tractors. It does not. Robotics, electrification and connected autonomous systems are all going to needed in future agricultural systems, but where significant power is needed, the internal combustion engine still has a very important role.

Wholesale electrification is not really practical right now.

The Conference is timely because of what I refer to as the diesel engine furore, but it will not entirely focus on engine developments (from whichever brand). The aim is to be a little broader in the way we tackle the sustainability bit of "sustainable intensification".

That is a critical question for all of us as agricultural engineers and, as usual, a whole system approach will be needed. There will be room for all in this conversation. We need to consider the supply chain opportunities, the logistics of what we grow and where, and very importantly we need to consider both the soil itself and the way in which we manage water going forward.

So, all in all I think it will be a wide ranging and informative programme, and I know the team at Rothamsted will make us feel very welcome in what are some excellent conference facilities.

I really hope you are able to join us for what I know will be a very interesting day.

Institution of Agricultural Engineers

2018 YOUNG ENGINEEERS COMPETITION

Perkins
THE HEART OF EVERY GREAT MACHINE

IAgrE

Open to Sixth Form teams, Landbased Colleges and University Departments
To be held at
Perkins Engines Company Limited, Peterborough, PE1 5FQ
On **Tuesday 20 March 2018**

Further information and Competition Pack
Sarah McLeod 01234 750876
E: secretary@iagre.org W: www.iagre.org

SHAKE-UP FOR CEREALS

Cereals 2018 is set for a major shake-up following the establishment of a new advisory board tasked with making the event even more relevant and technically focussed.

"Comexposium, the new owner of the Cereals Event, is determined to respond to the constructive feedback we received this year and make substantial changes for next year," says event director Jon Day.

The board will comprise exhibitors, sponsors and farmers, and from this year's feedback will develop new ideas for next year. In addition, there will be a larger feedback group, enabling all stakeholders to comment on and influence the shape of the event.

"We are keen to adopt a more open and collaborative approach with the industry, so there will be plenty of opportunities to provide feedback and input going forward," adds Mr Day. "It is a tried and tested way of working and how Comexposium – which runs the SIMA event in Paris - develops its other events."

Cereals 2018 will return to Duxford, Cambridgeshire, on 13-14 June 2018. "The development of these two groups marks a step-change in the event's development, taking Cereals forward in a new direction that focuses on technology and depth of technical content," says Mr Day. "Innovation, insight and information will be the pillars of the event and will underpin the changes"

IAgrE showcased its member services and the latest technology on its stand within the Fields of the Future exhibit at this year's event.

CHALLENGER TRACTORS MOVED INTO FENDT BRAND

AGCO's Challenger products, including its rubber-tracked tractor line-up, will be integrated into the **Fendt** brand in Europe before the end of this year.

The arrangement, which only applies to Europe and the Middle East will result in the production of Challenger products being moved from AGCO's factory in Grubbenvorst in Holland to Hohenmolsen, Germany – the site on which various Fendt self-propelled forage harvesters are built.

European Fendt dealers will be able to sell Fendt-branded tracked tractors and sprayers – after this year's Agritechnica show in November. Deliveries of the first machines are planned for the first quarter of next year (2018).

Challenger products will continue to be sold through the existing network (in the existing colour scheme) in North America, South America, Asia-Pacific and Africa.

Challenger Tractor

BAGMA 100 NOT OUT

The British Agricultural and Garden Machinery Association (BAGMA) celebrated its 100th anniversary in August.

Established in 1917 as the National Association of Implement Dealers, the name changed in 1928 to the Agricultural Machinery Dealers Association and changed again in 1944 to the Agricultural Machinery and Tractor Dealers Association.

The association became the British Agricultural and Garden Machinery Association in 1972 after an extensive review of its relationship with members.

During its 100 years, the Association has had 52 presidents, most of whom have served a two-year term and have come from many of the well-known family-owned dealerships from the landbased industry.

Two of the driving forces behind the creation of an association of implement dealers were AJ Fletcher of Drake & Fletcher, Maidstone, who, as a member of the Kent Implement Dealers Association, "saw the necessity of a national association", and Sir Ashton Lister of Dursley, who "circularised over a thousand implement agents to ascertain their views as to the establishment of an Association".

The aim was to create "a powerful organisation of implement dealers, who would vigorously safeguard and promote the interests of the trade and be in every way worthy of the increasingly important industry it represents."

The first committee comprised 20 'gentlemen' representing different parts of the country. C Hussey of Hammond & Hussey of Croydon was the first chairman and AJ Fletcher was elected as secretary.

Of the 20 companies represented on that first committee, six are still members of BAGMA. These are TH White of Devizes, Alexander & Duncan of Leominster, AT Oliver of Luton, G Thurlow & Sons of Stowmarket, F Randell Ltd of North Walsham, and Peacock & Binnington of Brigg.

CEO

Reflections on a changing world

Alastair Taylor *IEng CEnv MIAgrE*

PROMOTING PROFESSIONAL REGISTRATION

Notable for diversity of recent applicants

In July this year, the IAgrE Membership Committee successfully assessed a Chartered Engineer, an Incorporated Engineer and an Engineering Technician. Whilst this doesn't sound particularly remarkable and I am sure that our larger professional engineering institution brethren are doing this all the time, no one could remember IAgrE signing off all three grades of professional registration on the same day.

What was more interesting for me was the diversity of applicants. All had developed their occupational competence through individual routes. All were doing interesting jobs. All had made that commitment to becoming professionally registered. We need more of these.

By way of background, becoming registered as a professional engineer is possible through two main routes. The standard route is for those who have completed an approved qualification. This means that the degree or diploma has been evaluated as meeting the relevant professional registration criteria. Clearly, it makes life easier if a candidate comes to us with that qualification. Add to that some relevant experience at an appropriate level and the assessment process becomes relatively straightforward.

. . . life offers a very rich vein of opportunities to develop occupational competence

In this case, two of the candidates did not have the approved qualification. One was at to lower level and the other in a different engineering discipline. However, life offers a very rich vein of opportunities to develop occupational competence and this is referred to by a range of names; lifelong learning, experiential, career learning, etc. Engineering Council call this the Individual Route and given that a wider diversity of people from different backgrounds; science, computing, electronics, etc are starting to work across the Agritech space, we are finding that an increasing number of candidates have to be assessed through this Individual Route.

At IAgrE we have developed what we believe is a fairly straightforward approach to assessing these individuals. We call it the Career Learning Assessment (CLA) and both the new Chartered Engineer and Incorporated Engineer utilised this route. If you know someone who might be eligible for professional registration but might be nervous about their qualifications, do let them know that there is a way.

This links to another initiative we will be rolling out which is loosely called "Nominate Another". It runs off the tongue rather well so do please look through your professional friends and point them in our direction if you feel they would benefit from being part of the IAgrE family.

. . . . initiative will be loosely called "Nominate Another".

It would be remiss not to mention the new Engineering Technician we registered back in July. He was not from the usual pool of technicians working at machinery dealers and manufacturers but from a very large farming enterprise specialising in vegetable production across the fens. The technology and equipment used in that sector is becoming increasingly complex so it is great that a technician from that area views IAgrE as the go to professional engineering institution.

LOOKING FORWARD . . .

The summer months at the IAgrE Secretariat are, in theory, a quieter period when we can catch up on the more mundane things such as reviewing our procedures, refreshing the website and catching up on paperwork.

Having worked in education for a big part of my life the start of the academic year's always feels like New Year to me and in many respects, IAgrE works to a similar agenda. However, this year is turning out to be as busy as ever and our eyes are firmly fixed on the future.

It seems only yesterday that IAgrE was celebrating its 75th anniversary and in 2018, we become an octogenarian. So how are we going to celebrate our eightieth birthday?

Plans are afoot with lots to look forward to. Perhaps a nod to the past but more importantly a focus on the future. A special event or two. Special publications to mark the occasion. A great opportunity to mark out our special place in the world and the importance of agricultural engineering and technology to feed a hungry world.

Watch this space …

CONFERENCE PREVIEW

2017 **IAgrE LANDWARDS CONFERENCE**

WEDNESDAY
11 OCTOBER 2017

DECARBONISING AGRICULTURE
Perspectives and Policy for Change

SPONSORED BY:
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VENUE:
RoCRE
CONFERENCE CENTRE
(ROTHAMSTED CENTRE FOR RESEARCH AND ENTERPRISE)
HARPENDEN,
HERTFORDSHIRE

Rothamsted is situated in the beautiful Hertfordshire countryside, on the outskirts of Harpenden and close to St Albans. As an integral part of the Rothamsted Centre for Research and Enterprise, the Rothamsted Conference Centre is uniquely situated to host international science events and conferences.

TRANSPORT AND ACCCOMODATION

CAR: Harpenden is about 7 miles north of the M25 London Orbital Motorway and close to Junctions 9/10 of the M1. From Junction 9 follow the signage to Redbourn, then Harpenden. From Junction 10, take the A1081 to Harpenden. Free car parking is available for users of the Rothamsted Conference Centre.

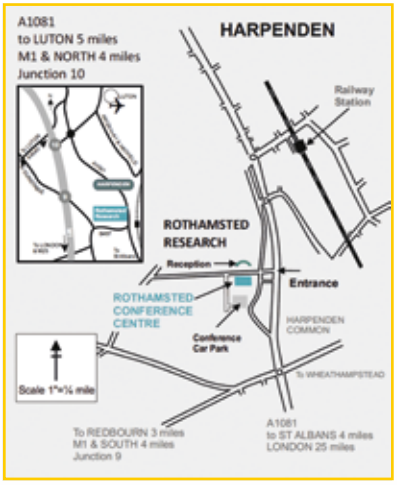
TRAIN: Harpenden has frequent trains from central London (St Pancras International). The journey time is about 30 minutes and the station is a ten minute walk away from Rothamsted.

AIR: The closest international airport is Luton. Take the coach to Luton Airport Parkway train station and take the rail line direct to Harpenden. From Heathrow take a Piccadilly line underground train towards Cockfosters to St Pancras International and take the rail line direct to Harpenden.

HOTEL: IAgrE has secured a number of rooms at the Aubrey Park Hotel The hotel is conveniently located near J9 of the M1 motorway on the outskirts of Hemel Hempstead. Contact Sarah at IAgrE for further details and availability.

COST:
Delegate
£120 + vat,
Retired
£75+ vat,
Student
£40 + vat

Booking:
www.iagre.org/eventbookpay/iagre2016



CONFERENCE PROGRAMME

9.30-10.00 Registration and coffee

10.00 Setting the Scene - Dr Robert Merrall, IAgrE President
What are the facts and where are we now? What is the carbon impacts of UK Agriculture? What are the pressure points? How will things look if we don't do anything? Can we reach a view of the true carbon footprint of food production – field to plate? What will happen if we do nothing?

10.15 Agriculture and the Low-carbon Economy - Dr Jonathan Scurlock, Chief Adviser, Renewable Energy and Climate Change, National Farmers Union
Setting the scene, reviewing the future of managing agricultural emissions and including the latest developments in battery energy storage and possible vehicle-to-grid applications for farmers. Challenges facing businesses and policy makers

10.45 The Energy Independent Farm - Carlo Lambro, President New Holland Agriculture
The Energy Independent Farm is a new approach, where farmers will be able to generate their own energy to run their farm and agricultural equipment. By using wind systems, solar panels or biomass and biogas processes located right on the farm, the farmer can independently obtain electricity and use it to generate hydrogen to power farm machinery and also to supply electricity.

11.15 Coffee Break

11.30 Transport Free Supply Chains – Jonathon Lodge, City Farm Systems
Is there a different way of producing food closer to its market. Up on the roof, down underground. What about harvesting crops just before the point of sale with no transport. Are we on the verge of a new way of farming and what would be the impact of all of this in reducing the carbon footprint?

12.00 Soil! Our Natural Capital - Professor Jane Rickson,
Professor of Soil Erosion and Conservation in the Cranfield Soil and AgriFood Institute, School of Water, Energy and Environment, Cranfield University *will cover the importance of soil as a key carbon sink – at global, regional and local scales; how this has changed over space and time; and how we can manage this vital (yet unrenewable) natural resource to both prevent any further loss of carbon, but also increase the storage of soil carbon.*

12.30 Energy Crops and Carbon Reduction - Dr Ian Shield, Agronomist
Rothamstead Reasearch *will discuss the latest research and how that fits with the BBSRC Strategic Programme on "Cropping Carbon".*

13.00 – 13.45: Lunch and Networking

13.45 EXPLORING ROTHAMSTEAD Professor Achim Dobermann, Director and Chief Executive of Rothamsted Research
Prof Dobermann will welcome delegates to Rothamsted and introduce the afternoon session. He will give a brief overview of its new Science strategy and the role of engineering and technology. This will be delegate's opportunity to take a look at some of the cutting edge research being carried out at Rothamsted. Groups will be shown round all the following areas:

- Energy Crops – Miscanthus & Willow
- Bee Radar & Suction Traps
- Field Scanalyzer
- Greenhouses & Growth Houses inc Heat & Energy Exchanger
- Rothamsted Archive – 175 years of plant and soil samples

The afternoon's activities involve some walking and we recommend sturdy shoes and clothing appropriate to the weather.

15.50 – 16.00 Conference Wrap up

Feedback

Responses to **Landwards** Feedback to the Editor chris.biddle@btinternet.com

Dear Sirs

I read with interest your President's Musings in the Summer edition of Landwards.

He believes that there is still scope for truly simple engineering interventions to have significant impact, and that collaboration is the key to achieving some measure of 'sustainable intensification'.

I write to advise you of an example of both of these principles in practice. Although I am a MIAgrE, I come from the road sector, practicing in developing countries. We have been promoting and applying the use of agricultural tractor technology for rehabilitation and maintenance of unpaved (earth and gravel) surfaces in African countries for some years.

A current initiative aims to set up a tractor technology demonstration-training initiative in Zambia for rural roadworks using proven approaches.

The potential benefits are enormous; with unit costs for road works expected to be approximately halved when compared to 'traditional' specialised, heavy civil engineering equipment based methods, which focus on the use of motorgraders.

There is scope for tractor owners in rural Africa to raise their typically low utilisation rates, by finding paid work in the local road sector.

The Win-Win will be higher utilisation of modest cost equipment investments and earlier 'pay back' in environments where interest rates are typically in the range of 15 – 35% p.a.. For farmers, the benefits will be improved access and lower transport cost for their inputs and crops.

Spoilage should be reduced and investment encouraged by year round access.

We have secured the cooperation of the local agriculture, roads and local government organisations, as well as the representatives of the Micro, Small and Medium Enterprises (MSME) associations.

Kind regards
Rob Petts MIAgrE
and Kingstone Gongera

SOIL

CARING FOR NATURE'S GREAT PROVIDER

Soil is the great provider and an engineering medium. A habitat for soil organisms, recycling system, regulator of water quality, modifier of atmospheric composition and, of course, a medium for plant growth. Soil contains most of the worlds genetic diversity.

The complexity of soil structure engages many disciplines - biology, chemistry, geology, physics, geography, mathematics, microbiology and forestry – and thus can be described a truly integrated science.

As a result of their never-ending research, soil scientists can provide the solutions to problems of crop production; pollution control and the reduction of soil degradation.

This feature will consider the role of just some of the people engaged in soil science along with the answers they are providing to ensure that the substance often referred to as the 'Skin of the Earth' retains its unique and remarkable qualities.

"The nation that destroys its soil, destroys itself".

Franklin D Roosevelt

FUTURE FOR SOIL SCIENCE

Solutions to come from greater understanding of soil at microscopic level

There is a generally held view that our soils are in trouble.

But despite gloomy headlines, there are reasons for optimism as new technologies help improve our understanding and management of an extremely complex soil environment.

The problem of soil degradation is not new. The great dust storms in the US through the 1930s being one example. But with the prediction that there will be more than nine billion mouths to feed by 2050, the challenges today are much more pressing.

Speaking at the second of a series of Arable Horizons seminars organised by Farmers Weekly in association with Syngenta earlier this year, Professor Wilfred Otten, Professor of Soil Bio Physics at the Cranfield Soil and Agrifood Institute highlighted key aspects of science that will influence the future of UK farming. He focussed on today's immensely complex demands on soil, which go far beyond its capability just to grow food.

"For every action, there is a reaction and potential effect on another part of the matrix of demands on soils and land. Farmers need to be increasingly aware of their actions, but we also need to be able to provide the science to understand, predict outcomes and enable solutions to build more resilient soils. This will only put more pressure on our soils and further compromise their ability to produce food and support other vital ecosystem services, such as biodiversity, water quality and carbon storage"

Professor Wilfred Otten

CLIMATE CHANGE

There is also the issue of climate change, with predictions of more extreme periods of hot and dry or wet weather increasing the risk of wind erosion or run-off. "Immediate action is required to stop this decline and agriculture will be at the forefront of that change" he said

Professor Otten noted several strategies and technologies that will help farmers meet this challenge.

Organic matter or soil carbon has huge potential to not only help improve the health of agricultural soils, but also offset the impact of carbon emissions on climate change through sequestration.

This potential has been reflected in the "4 per mille" soil carbon improvement target agreed at the 21st annual Conference of the Parties in Paris, as part of the United Nations Framework Convention on Climate Change.

It was the first time soil science had been included in the climate change agenda as a potential solution provider and 150 nations signed up to increase organic carbon content of their soils by 0.4% each year for the next decade.

"Responsibility does not solely rest on agriculture, but 20-30% of the target can be attained by farmers to make a significant difference to slowing the impact of climate change" he said "It will also bring some indirect benefits to farming and hopefully public recognition that farming, rather than eroding our soils, can make a positive contribution to soils and to society"

SOIL HEALTH

Soil organic matter is our 'comfort zone' said Professor Otten. It is easily measured and we understand how to improve it, but the subject of 'soil health' sparks much debate on what it means and how it can be improved.

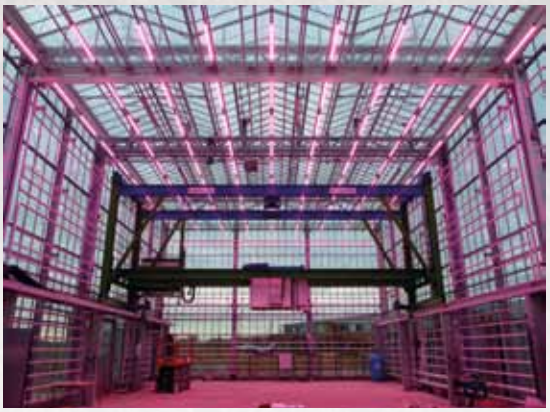
To shed some light on this, a recent study published in the journal *Soil* used farmers and land managers to identify on-farm practices that are thought to improve soil health. An expert panel of scientists and industry stakeholders looked at the available research literature designed to test those practices.

Each of the 27 identified were scored between 1 and 100 (100 being most certain) for effectiveness, certainty of evidence and potential negative side effects.

Of those assessed, just three (amending the soil using integrated nutrient management, growing cover crops and using crop rotation) were considered beneficial to soil health with a high degree of certainty, with a clear majority not supported by hard scientific evidence.

Some of these were surprising, with controlled traffic farming practices considered only "likely to be beneficial".

Soil Health Facility at Cranfield



Similarly, changing tillage practices, such as shifting from the plough to no-till, or converting to an organic system were seen to have a high number of trade-offs after the review.

Professor Otten explained this doesn't necessarily mean these practices should be ignored, but instead it has proven to be a useful exercise in highlighting areas where there is room for improvement or knowledge gaps to fill.

"We tend to focus on the 'knowns' and make them better, but maybe we should focus on the 'unknowns' that we have in science and take a 'leap of faith' and say 'this is where we can make the improvements'.

As part of the government's Agri-Tech strategy, the Centre of Applied Crop Science (ACS) was established with a new Soil Health Facility, set up at the Cranfield Soil and Agrifood Institute to accelerate the pace of applied soil research.

Large containers can be used to simulate any physical and structural soil conditions and managed using a variety of techniques – such as no-till or any number of crop rotations – in a range of climatic conditions in the glasshouse.

Professor Otten explained this revolutionary method will allow the rapid assessment of how cropping practices affect soil health in simulated field conditions, cutting out some of the heterogeneity of similar studies in the open environment.

"This will be a big step change for providing the evidence base for soil management practices. We can assess different strategies and provide better advice for implementation, giving more guidance as to when it will work and when it won't - so it will be more targeted advice," he said.

SOIL PORE SPACE

Another area that could potentially lead to advances in soil health is using novel technology to examine soil pore space at a microscopic scale.

It is in this pore space where all the chemical and biological processes of a functioning soil take place and has been largely ignored in the past, but could provide the key to designing revolutionary new techniques in soil management.

One of the tools that will help to open this "black box" is X-ray tomography, which can produce 3D images of soil – in large blocks to tiny aggregates – to effectively give scientists a map of pore space and how it is all interconnected.

. . . . the first time soil science had been included in the climate change agenda "reduction in pesticide and fertiliser would lead to faster soil degradation"

It is hoped this will unlock how physical soil properties and large-scale management practices interact with the micro-organisms and how those same micro-organisms interact with each other and with crop plants.

This could ultimately give farmers the ability to manipulate the microbial community in the soil to benefit crops by optimising and reducing our reliance on fertiliser and pesticide inputs.

"If we are to find a way to steer the micro-organisms in the way we want them to behave, to get benefit from it, we need to understand these processes," said Professor Otten.

One of the imminent questions for policymakers and farmers is whether we focus on developing the few areas that we know could make marginal gains for soil improvements, or whether we look for more radical solutions that could make a step change added Professor Otten.

However, all the review of academia had concluded that the one aspect of agronomy that would be universally detrimental to soils and farming systems, would be the reduction in pesticide and fertiliser application, which was concluded would lead to faster degradation of soils in the pursuit of profitable food production.

Furthermore, Professor Otten presented a compelling argument that, whilst the effects of soil degradation was being seen and experienced on a field scale, the key solutions would come from the understanding of soil science at a microscopic level. Not just the soil particles themselves, but also the gaps between them where the action happens, and the interaction with plant roots that influence the biodynamics within the soil.

With the immense scale and investment in soil research and science currently being undertaken, Professor Otten also warned of the danger of being overwhelmed with results and data, without being able to implement in practice.

MEET A SOIL SCIENTIST: ALEXANDRA COOKE CEnv MIAgrE

CLOSE-KNIT COMMUNITY, VITAL ROLE

Alexandra Cooke is completing her Ph.D in Soil Science at Cranfield this year having already gained a BSc and Masters Degree in related subjects as well as a spell in industry. She talks to Landwards editor Chris Biddle about her fascination with soil and how her work can benefit the environment

Career options for students manifest themselves in many guises. For Alexandra (Alex) Cooke, it was the opportunity to study soil science as part of her Geography A-Level at King Alfred's College in Wantage. "Unusually, and I think KA was one of the only schools in the UK who included pedology (the study of soil in their natural environment) in its geography module alongside meteorology and oceanology".

From the start, Alex was hooked. It probably helped that study of the earth ran in the family, Alex's father is a cartographer, and having gained her A-Levels she enrolled at Cardiff University, gaining a BSc in Environmental Geoscience opting for soil related modules during which she undertook a project in Mediterranean France studying the interaction between plants, the soil and geology.

"It's a very rewarding area to work in because soil science has an input into many current global issues" says Alex "and not just those which are environmental. However, it's not something that many UK universities provide specific training in and so you are more likely to stumble into the soil science discipline, which was rather my case, than train specifically in it"

After graduation, Alex went on to gain an MSc in Land Reclamation and Restoration at Cranfield University. The course included Soil Plant Environment Science; Soil Engineering, Contaminant and Nutrient Management; Land Engineering and Water Management; Landscape Ecology and Ecological Restoration.

INDUSTRY

In 2013, following Cranfield, Alex had a spell in industry with Newcastle-based mining consultant Wardell Armstrong working as the company's Environmental Soil Scientist. She worked on a variety of projects across the mining, minerals, energy, utilities and development sectors. These included soil type identification and surveying for Agricultural Land Classification assessments, Impact analysis on agricultural farm businesses, soils balancing and aftercare monitoring during interim and final works of mines and quarries to enable successful sustainable restoration.

But the desire to add to her skills sets and gain further qualifications still fuelled Alex's ambitions, and she returned to Cranfield in 2014 to sit for her Doctorate of Philosophy (Ph.D) in Sustainable Engineering, Agriculture and Climate Change, a course she will complete in the Autumn this year. She still retained her link with Wardell Armstrong, working for them on a casual business when her Ph.D studies allow. "I realised that soil science in industry responds well when people have obtained a doctorate. You are generally better equipped to obtain the more interesting and novel pieces of work, but industry is frequently only interested in the very basic soil science information. However, having now spent 3 years in academia, I realise I would like research to form part of my future career"

Alex's research, which is sponsored by the Environment Agency and the Douglas Bomford Trust, involves developing Filter Socks, an end-of-pipe solution used on construction sites in the US, ensuring that they are suitable for agricultural lands in the UK. "The aim is to mitigate soil erosion, runoff and phosphorus losses in arable lands, under different climate change scenarios" she says.

Although her research, which involves rainfall simulators and laboratory work at Cranfield, also requires comprehensive field trials. "I had to find a willing farmer to let me use part of his land to test my research over the course of the Ph.D" she says. Fortunately I've found an ideal site on a farm in Herefordshire where the practical trials continue"

The ultimate aim is that the development results in Filter Socks being adopted as a Best Management Practice (BMP) in agricultural lands in order to reduce poor water quality.

It is clear that Alex loves the challenges and variety of her work and research as a soil scientist. "Although that is my speciality, I look on myself as an agricultural engineer, an all-embracing role that encompasses so many disciplines and demands"

LACK OF RECOGNITION

"I love the soil science family. Although numbers of us are increasing, there's still not very many of us, and so in the UK especially we tend to all know and work with each other, like a close-knit family"

"I have a hard time coming to terms with the lack of recognition of the importance of soil by the world's governments and industries. For a start, there is limited planning policy for soils. Yet, every soil scientist knows how crucial soils are to our planet, food production, nutrient cycling, elemental cycling, water retention and purification amongst many other things. And yet there are hardly any laws protecting soils, making it easier to justify their degradation and destruction"

Traditionally soil scientists have

always been men, probably because of the long hours in all weathers, however nowadays there are plenty more women soil scientists who are in the discipline because of a natural care for the environment.

"It's great that more women are taking up soil science, says Alex "however, I think the real issue is the general lack of people in the discipline, not just women. There are a lot of opportunities spanning the soil-water-agricultural sciences, and just not enough people to fill them"

"We need to do more to engage the younger generations to make sure they realise how important they are to secure the future of the world's environment"

Being such a small community, the inter-change of ideas, thoughts and questions are essential to Alex and her colleagues. An avid user of social media, she is a regular participator in the lively Dirt Doctors website (www.thedirtdoctors.com) and Twitter (@DirtDocs).

"They are a great resource" she says "full of great feedback and experiences from the soil community – and also shows that we don't always take ourselves too seriously!"

"One of the most eye-opening events I've been to was the International Erosion Control Association Conference held in Atlanta in February. It was mind-blowing experience with almost 2000 delegates and over 300 exhibitors discussing and listening to papers on erosion, sediment control and stormwater control. They are so far advanced in the US, that you cannot help but return with a hat-full of ideas"

I wondered how Alex started to explain her role in gatherings outside the soil community?

"It's difficult to easily explain the complexities of what I do, so I tend to tell people that with 87% of rivers failing water quality targets, my role is to reverse that trend".

There is little doubt that Alex Cooke has got the bit between her teeth when it comes to 'making a difference'. Earlier this year, she gained the Chartered Enviromentalist (CEnv) qualification, she is a Council Member of IAgrE and Student Representative on the British Society of Soil Scientists. (BSSS) as well as being in demand to speak at soil and environmental conferences such as the recent Groundswell event.

The landscape is so often depicted as fields of swaying corn. Rivers running free; rich and verdant flower and fauna; parks, sportsgrounds and open spaces. But none of this would be possible without the richness and quality of 'what lies beneath'

ANNUAL UK SOIL EROSION COSTS £165M

Over cultivation of soils is costing taxpayers

It is estimated that 10% of arable land in the world can be termed as conservation agriculture using techniques such as no-tillage to conserve soils, but the US, Brazil and Argentina are well ahead of the UK, which only has 150,000ha of land in conservation agriculture. It has been further calculated that 75bn tonnes of soil is lost annually around the world.

Professor Jane Rickson, professor of soil erosion and conservation at Cranfield University, says it has taken 1,000 years to create 150mm of topsoil, and intensive cultivations can lead to the reduction of this valuable resource.

She says that reduced-tillage, cover crops and good rotations are needed to cut the £165m-plus annual cost of soil erosion on farms in England and Wales.

The overcultivation of soils is costing growers and taxpayers dearly as annual water erosion can be as high as 15t/ha of soil washed down the drain while the rate of soil formation is estimated at only 1t/ha.

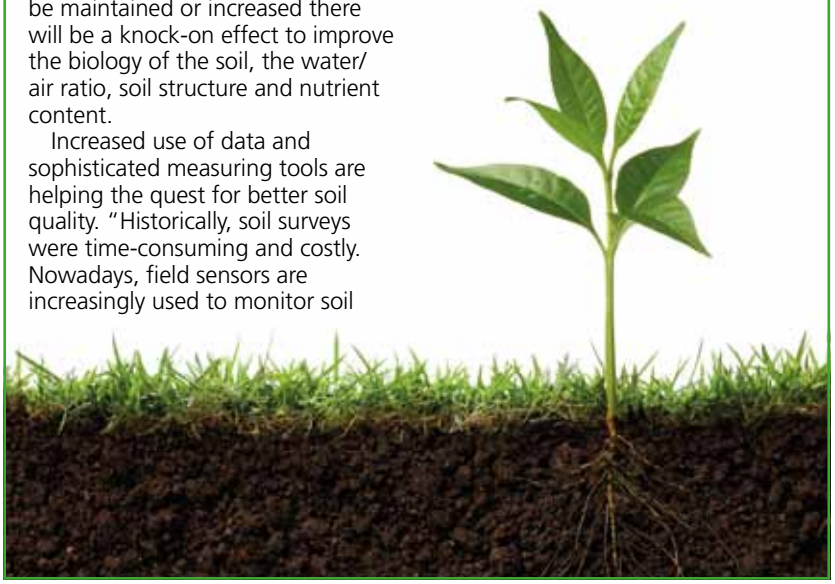
"Growers should be trying methods such as minimum-tillage and using cover crops to cut the damage from multiple cultivations and to add more organic matter. This will allow more carbon and water to be stored in soils which will help to mitigate climate change effects, rather than the overuse of machinery which can reduce a soil's storage capacity".

"Organic matter is key" says Professor Rickson "and if this can be maintained or increased there will be a knock-on effect to improve the biology of the soil, the water/air ratio, soil structure and nutrient content.

Increased use of data and sophisticated measuring tools are helping the quest for better soil quality. "Historically, soil surveys were time-consuming and costly. Nowadays, field sensors are increasingly used to monitor soil properties such as nutrients, bulk density/compaction and moisture content over space and time," says Professor Rickson. "Results can inform better targeting of fertilisers, tillage and irrigation, leading to more efficient use of resources and reduction in input costs. Soil structure can also be measured using novel applications of CT and X-ray scanning."

Cranfield is using 'big data', from the AHDB Horticulture funded 'Soil Management Information System' project. Large datasets from horticultural growers are combined with scientific evidence from previous research to identify patterns in the data to inform future soil management decisions.

Professor Jane Rickson is one of the speakers at the IAgrE Conference on 11 October. Conference theme is Decarbonising UK Agriculture, her paper is Soil – our Natural Capital



POLITICIANS VIEW

'SOIL – A CINDERELLA ISSUE'

Warning that soil degradation could lead to productive farmland being unprofitable

A report into the health of UK soil published in 2016 by the Commons Environmental Audit Committee said that the Government's ambition to manage the UK's soil sustainably by 2030 will not be met unless further action is taken. It said that failure to prevent soil degradation could lead to increased flood risk, lower food security, and greater carbon emissions.

Environmental Audit Committee Chair, Mary Creagh MP, said: "Soil is a Cinderella environmental issue. It doesn't receive as much attention as air pollution, water quality or climate change. But, whether we realise it or not, society relies on healthy soil for the food we eat, for flood prevention, and for storing carbon.

Around 300,000 hectares of UK soil are thought to be contaminated with toxic elements – such as cadmium, arsenic and lead - as a result of the UK's industrial past, but the Department for Environment, Food & Rural Affairs (Defra) has withdrawn capital grant funding for local authorities to clean up this contamination.

Soil is a massive carbon sink, storing three times as much carbon as the atmosphere. Soil degradation also leads to increased carbon emissions and could speed up climate change. The UK's arable soils have seen a worrying decline in carbon levels since 1978, with widespread and ongoing decline in peat soil carbon.

Mary Creagh added "Soil degradation could mean that some of our most productive agricultural land becomes unprofitable within a generation. Every tonne of carbon we can retain in soil will help us meet our carbon budgets and slow climate change. The government wants to see all soils managed sustainably by 2030, but their current actions will not be enough to reach that goal."

The Government relies on rules linked to farm subsidy payments to regulate agricultural soil health. But the MPs warn that these rules are too weak, too loosely enforced, and focus only on preventing further damage to soil rather than encouraging restoration and improvement.

Monitoring changes in soil health over time is key to developing effective policy, says the report. "Defra's current ad hoc approach to conducting surveys of soil health is inadequate. The Government should introduce a rolling national-scale monitoring scheme for soil health to ensure that we have adequate information about the state of the nation's soil"

MICHAEL GOVE . . . ON SOILS

'Current EU-inspired farming methods accelerating erosion'

On 21 July, Michael Gove, Secretary of State for the Environment, Food and Rural Affairs set out his vision on the future for our natural environment and for the delivery of a Green Brexit.

"The Common Agricultural Policy rewards size of land-holding ahead of good environmental practice, and all too often puts resources in the hands of the already wealthy rather than into the common good of our shared natural environment. It also encourages patterns of land use which are wasteful of natural resources and often intrinsically poor value rather than encouraging imaginative and environmentally enriching alternatives.

As the most recent report from

Lord Deben's excellent Committee on Climate Change and its equally excellent Adaptation Sub-Committee points out, current EU-inspired farming approaches are degrading our soil. In some areas a combination of heavy machinery, irrigation methods accelerating erosion and a determination to drive up yields has meant that soil has become less productive. It is not only less effective at sequestrating carbon it is, progressively, less fertile. The effect is most noticeable in what has been some of our most fertile growing soil, in the Fens, where a combination of the draining of the peat and the disappearance of hedges and trees over the years has led to a thinning of productive earth. According to the Committee's report, Britain has lost 84% of fertile topsoil since 1850 and the erosion continues in some areas at between 1cm and 3cms a year.

Now, whether environmental campaigner or farmer, we can all agree such a trajectory is, literally, unsustainable. Which is why we need to take the opportunity that being outside the Common Agricultural Policy will give us to use public money to reward environmentally-responsible land use"

FARMERS VIEW

ORGANIC ROUTE – WITH MODERN SCIENCE

Economic benefits in the long-term

"We need to go back to how my grandfather farmed, but using modern science," says Andrew Blenkiron, Estate Director at Euston Estate, Suffolk.

"To run environmental schemes is quite a challenge to fit in with the farming side of things, so there should be a reward or enhanced compensation" says Andrew. "However, the complexity of how we are going to calculate that is quite a challenge."

Natural Capital – which includes the Earth's stock of water, land and air – applies economic thinking to the use of natural resources. Andrew believes it is critical to manage these assets effectively or lose the benefits they provide to the rural economy. The 11,000 acre Euston Estate has preserved its natural assets, such as woodland alongside its farming operations.

Approximately 6,260 acres are farmed, on which wheat, barley, oil seed rape, forage maize and sugar beet are grown. The land is also used for free-range pig and poultry farming, alongside potato, carrot and parsnip production by agreement with other producers.

Andrew believes that it is important for long-term soil security to put organic material back on the land, taking the opportunity to build up fertility rather than remove it with the harvest. However, this can be difficult to justify from an economic perspective.

He says: "We need to enhance the utilisation of green manures, catch crops and the integration of more organic material. We are doing that through our various livestock enterprises. Also our anaerobic digestion plant produces a vast amount of organic material on an annual basis.

"I believe that over the last 40 to 50 years, we have become overly reliant on artificial inputs – it's too easy to get a bag of fertiliser or a can of spray. We've got a lot more evidence to demonstrate that sustainable rotations, like my grandfather used to do, is a more sustainable way to boost fertility"

The biggest challenge that Andrew faces at the moment, is working out the economic benefits of spreading 30,000 tonnes of organic material from the anaerobic digester, compared to the cost of artificial applications. "There is maybe no economic gain if you look at it on a straight costings basis, but I know that the organic material will have the longer-term benefit on the soil health."

Euston Estate is making the most of the latest technology to ensure that water is used economically. The irrigation reels have their own built-in sim card, so that they can be controlled remotely by mobile phone apps. Water is applied according to soil moisture probes and accurate weather forecasts.

Looking to the future, Andrew already has some ideas of where he would like to see the agri-tech develop. "We could potentially have farmers' extraction pumps linked to the Environment Agency controlled gauging stations. If the Environment Agency gauging station on our river had a telemetric link through to their central computers, these could tell our pumps when to switch on, when rivers go to a certain level. It could equally tell them when to switch off"

The days of cheap food are not over in the short to medium term says Andrew. "As the world population continues to increase, farmers are doing an incredible job, meeting and even exceeding demand, but we need to have some criteria for the food imported into the UK; it should be measured for its sustainability versus how we can do it here"

Andrew Blenkiron is one of the speakers at the 2017 REAP Conference organised by Agri-Tech East at the Wellcome Conference centre on 7 November.

"There are examples from around the world where they are moving vast amounts of water, in the form of fresh produce e.g. tomatoes around the world. In effect we're moving water from climates that aren't sustainable in terms of the abstraction of that water from their aquifers. It's being moved across the world to countries that have enough water"

"The opportunity is here, but the political will isn't – if we want to continue to provide cheap food, this has either to be through subsidised production in the UK, or through continuing to harvest the natural resources of other countries"

" .. .organic material will have the longer-term benefit on the soil health"

TACKLING TRAMLINE 'RIVER' LOSSES

80% of water run-off from cultivated fields, containing pesticides and nutrients, comes from tramlines.

2017 IAgrE Journalist Award

The 2017 British Guild of Agricultural Journalists (BGAJ) and Institution of Agricultural Engineers (IAgrE) Award for articles with an engineering theme was presented by IAgrE chief executive Alastair Taylor at the Cereals event on 14 June.

Winner of the 2017 IAgrE award was Andrew Blake for his article ***Tackling tramline 'river' losses***, published in *Tillage* magazine.

Judges said Andrew submitted a "well-written piece with good in-field shots of various systems that tackle an engineering problem many farmers prefer to forget. The clear explanation of some clever but simple engineering has real potential to impact on everyone's water quality, or reduce the clean-up costs"

Runner-up was Adam Clarke for his article ***Closed transfer systems offer salvation for pesticide products,*** published in *Farmers Weekly* which judges said "simplified a complicated issue and offered practical solutions in a piece of broad interest to anyone spraying crops today".

Andrew Blake's article is reprinted here courtesy of Tillage Magazine *(www.tillagemagazine.net)*

Andrew Blake (left) with Alastair Taylor

It makes both economic and environmental sense to retain as many arable inputs within fields as possible. That's the reasoning behind a recent part AHDB-funded project* examining ways to reduce losses via tramline 'rivers'.

Although the work focussed on soil erosion and phosphorus losses, water flowing in tramlines may also convey other nutrients as well as pesticides especially after autumn spraying.

Any applied fertiliser escaping by this route clearly wastes money, and the presence of certain pesticides in watercourses challenges water companies' ability to provide drinking water below the EU's maximum 0.1microgram/litre concentration. Experts fear that their continued presence could lead to restrictions or even a ban on the use of certain autumn-applied herbicides.

Although only about 10% of annual pesticide losses from fields are via surface run-off (most leaving via drains), pressure remains to cut pesticide levels in surface waters, warns Jim Orson of NIAB TAG.

Jim Orson

"Around the turn of the millennium, I was involved in an EU research project that aimed to reduce soil erosion on a landscape scale. It was led by the burgermeister of a small German town who was fed up with the underground car parks filling up with silt after a heavy rain.

"One of the main findings was that around 80% of the water running off the surface of the cultivated area of fields was from tramlines, and that water contained pesticides and nutrients. This came as a profound shock to me and farmers at the meetings where the results were presented."

The growing adoption of controlled traffic systems, effectively leaving more permanently compacted tramline 'river' beds, could make retaining inputs falling onto them even harder, some commentators at the recent Tillage Live event suggested.

In winter, any surface run-off and erosion moving sediment off fields can carry surface-applied pesticides with

Dr Martyn Silgram

it, warns ADAS's Dr Martyn Silgram who led the AHDB project.

"Such losses can be very significant locally on shallow and moderately sloping light and medium textured soils which are unlikely to be artificially drained," he says. "And these risks will be greatest in October-February when fields are wet and bare and when autumn and winter spraying takes place."

In practice any tramlines with a slope of 4-10%, depending on soil type, can act as nutrient and sediment conveyors when sufficiently wet, he warns.

In theory, sowing tramlines, either partially or completely and spraying them off later using GPS should allow the young plants to 'block' any flow and intercept pesticides and nutrients.

"However, we found that under UK conditions this had negligible benefit, and it was soil compaction caused by autumn sprayer traffic, not the lack of over-winter vegetation in wheeled areas, that was the single most important factor in allowing tramlines to promote rapid surface run-off," says Dr Silgram.

Previous work at Cranfield University has shown that about 80% of that soil compaction occurs during the first pass with tractor and sprayer, he adds.

Avoiding creating tramlines on loose fluffy seed-beds or when the soil is very moist can help, but may not always be practical, he admits.

The AHDB research highlighted the value of fitting tractor and sprayer with very flexible (VF) tyres.

Running at half the pressure of conventional tyres they caused less compaction and cut surface run-off and erosion losses by up to 75% over four commercial sites in England and Scotland.

"These VF tyres are really effective and a no-brainer if you want to help prevent run-off losses. Their higher cost should be more than offset by their claimed increased fuel efficiency and longer lifespan, and the flexibility they offer to farming operations," he says.

Another effective research approach was to change the concave imprint in soil caused by traffic into a convex shape using a novel surface profiler-roller-tine unit**. Made from a patented polymer and featuring a rippled surface, it was self-cleaning and the convex shape helped shed water back into the crop area.

"This approach reduced run-off by up to 85%, but it needs a separate pass and so is less practical in winter cereals. But allied ADAS research has shown it appears more cost-effective for reducing run-off and in row crop systems such as potatoes."

A tramline 'tickler' – a type of self-propelled rotary harrow – designed

during the project was even more effective, notes Dr Silgram. Designed to run behind the sprayer on a toolbar hydraulically linked to the tractor cab, it uses small offset spikes to leave 5cm deep indentations in the wheelings to break any capping and help water filter into the soil, he explains.

"Their diagonal configuration avoids any impact on subsequent traction, and we found that using the harrow reduced run-off by up to 95%."

However, the potential benefits could be overwhelmed by extremely persistent wet weather, the research report notes. "So the ideal approach might be to combine the use of VF tyres and the harrow," he suggests.

The harrow unit, costing about £4000, was designed by Wright Resolutions for trailed sprayers with Simba UK (now Great Plains), and modified for self-propelled machines by Household Sprayers.

Despite the availability of a Countryside Stewardship Scheme grant toward its capital cost, to date no growers have yet taken it up, acknowledges Household's sales manager Nigel Greaves. "But it will happen," he believes.

TINE PASS SOLUTION NOT THE ANSWER

Earlier DEFRA-funded research to mitigate sediment and phosphorus losses from the land led by Dr Silgram showed that pulling a tine straight down tramline centres did help infiltration, notes Philip Wright of Wright Resolutions.

"But doing so is totally inappropriate as the tramline is then left loose and further sprayer passes just make it compact more severely.

"Also, allowing water to soak directly into the tramline, as opposed to leading it away on either side, makes the tramline wetter beneath and far less trafficable after rain."

While working with Simba, Mr Wright helped develop the Aqueel tool (designed by Charles Creyke – who subsequently developed the tine-roller based solution to tramline run-off** with his company Aquagronomy) now sold by Great Plains.

"A development with massive potential to reduce surface water movement off soil, it had only one main issue with the tooth shaped wheels not self- cleaning under damp or wet conditions," he says.

"This meant making it flexible – which worked well using a microcellular type of polyurethane – but resulted in durability problems over time.

"But the concept works and is used by a number of root crop growers and on silty soils prone to capping and surface sealing, especially when under irrigation.

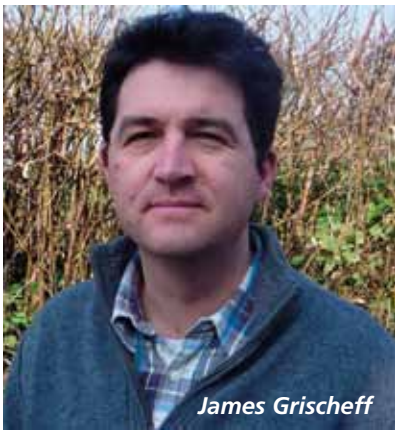
"However, I believe the flexible concept would prove challenging in hard compacted tramlines."

Mr Wright was also involved with the design and development of the tramline 'tickler' which was also made available for Chafer sprayers. But the firm's Nick Byrne admits it has received little grower interest.

"The units were relatively low cost and low return, and each needed specific sprayer fittings," says Mr Wright. "So Simba and latterly Great Plains didn't take the concept to a fully commercial version - it needs sprayer manufacturer involvement to push the concept further."

REMEMBER THE WIDER PICTURE

Tramline interruption is only one of many tools at farmers' and farm advisers' disposal to reduce the risk of run-off, erosion and pollution, stresses Natural England's James Grischeff, a senior adviser for Catchment Sensitive Farming. "It should not be seen as a cure- all.


James Grischeff

"It should be incorporated with good soil, machinery – which could include CTF -, fertiliser and crop management in the field, and should be backed up with appropriate buffers placement and drainage management if we're really going to support farmers to both reduce impacts on the water environment and protect their soil resource.

"The AHDB tramline work involves relatively inexpensive and innovative technology that I'm keen to see used when it fits within farming systems and works with the soil issues."

Currently the tramline rotary harrow unit is planned for use in some Countryside Stewardship Schemes, and some grant applications have been received, notes Mr Grischeff. "But we've yet to see one claimed for. However the new scheme only began in January this year so it's very early days and particularly for this new option.

"I understand that there have been a number of farmers who'll be working with their local CSF officers and machinery manufacturers to implement this method.

"I particularly applaud Household who've been willing to give this approach a go with a real product that they could market more widely.

"In my view this is another great example of where a government advisory scheme links with researchers and the commercial sector to create a real opportunity to make a difference to farming and the environment."

TRAMLINE MANAGEMENT PRACTICES

Other tramline management practices advocated as a result of the AHDB work to avoid the risk of compaction, run-off and erosion include increasing tramline spacing, for example from 18m to 24m or more.

Using an extra headland tramline at the lowest end of the field, disconnected from other tramlines, can permit the area between the two tramlines to act as a buffer strip to most of the field. And re-orientating drilling, and hence spraying, so that tramlines do not follow the steepest slopes should also help.

- Project RD-2007-3386 *Reducing risks associated with autumn wheeling of combinable crops to mitigate run-off and diffuse pollution*
- March 2009 – March 2014
- Total cost £1.2m, including in-kind contributions (AHDB funding £120,000)
- Sponsored by Defra and Scottish government through the Sustainable Arable LINK programme
- Wide range of industry partners.

Earthwake tool

AUGER APPROACH

The latest commercial stab at countering the problem of losses via tramlines is the Earthwake from Norwich-based Lland-ho.

The brainchild of Anglian Water Catchment consultant Rob Holland, the linkage-mounted tool uses a large metal auger to form angled grooves in the soil roughly every two metres allowing water to drain back into it.

"I believe that using the Earthwake to address tramline erosion will not only benefit farmers by reducing the amount of soil loss from their land but will reduce the amount of pesticides found in drinking water sources," says Mr Holland. "That should reduce pressure to remove certain pesticide active ingredients from the approved list."

The Earthwake's V-notch water diversion channels across each wheeling break the accumulated volume, flow and erosive energy, he explains.

"My guidance is to treat tramlines after some wheeling compaction has occurred – perhaps after two sprayer runs - but before water stops penetrating the soil and starts traveling horizontally as tramline run-off.

"Using it in waterlogged soils is not the idea," he warns. "The weight of the tractor while working will increase the compaction and soil damage."

A second pass after autumn spraying is complete might be appropriate to protect soils over-winter, he suggests. "It can be used up to stem extension as there's 100mm ground clearance under the central shaft."

It costs £7750 +VAT & delivery with an optional extra of hard-facing.

"None have yet been sold, but it's had a lot of interest and I'll soon have one available for hire. Trialling's been limited but will be extensive this autumn and winter."

Under Countryside Stewardship (RP31: Equipment to disrupt tramlines in arable areas) farmers can obtain a grant of £1500 towards such equipment, he notes. "But it's only available to those in Higher Tier stewardship."

Rob Holland

THE INNOVATORS

A MOVING COMBINATION

The innovation behind JCB's DualTech VT transmission, combining the benefits of hydrostatic and powershift, won the company a Silver Medal at the SIMA Innovation Awards in Paris last year. The revolutionary transmission fitted to JCB's Agri Pro Loadall telescopic handlers was said 'to transform the way materials are handled by farming customers'

According to JCB, telehandlers are averagely used 60 per cent of the time for handling work and 35 per cent for towing and road work - and idle for the remaining 5 per cent of the time. This split provides the biggest issue for telehandler buyers. Do they go for a torque convertor or powershift machine which provides good speed and towing capacity? Or for a hydrostatic machine which gives good pushing ability at slow speeds and precise speed control? Either option nearly always results in compromise. This is particularly true for spread-out farms that have grown into several units and who want a good road machine and a good materials handling unit.

JCB's DualTech VT is said to be the culmination of a 6 year development programme and 10,000 hours of 'real world' testing in various conditions, and is two transmissions in one, combining hydrostatic with power shift – and has been included with a new three-model range of seven metre JCB Loadall AGRIPro telescopic handlers with lift capacities of 3.1 tonnes (531-70), 3.6 tonnes (536-70) and 4.1 tonnes (541-70).

JCB Chief Engineering and Innovation Officer Tim Burnhope says "DualTech VT truly provides the best of both worlds, combining the low-speed controllability and easy driving characteristics of hydrostatics with the higher speed efficiency of direct drive powershift. Drawing on our expertise in both hydrostatic and powershift transmissions, DualTech VT is a massive achievement for our design and engineering team who have raised driveline technology to new heights"

How does it work?

DualTech VT is two transmissions in one; a hydrostatic module, which offers infinitely variable speed selection from 0-19kph, taking care of low speed handling work, after which, a three-speed powershift module takes over to propel the AgriPro up to 40kph.

Everything is done automatically, from the transition between hydro and powershift modules to the powershift changes. No torque convertor is used in the powershift portion of the transmission, using clutch packs-only to change gears, providing direct drive to the wheels.

Hydrostatic drive

The hydrostatic drive module of the DualTech VT transmission uses an electronically-controlled hydraulic pump and motor combination to provide fast response, fine speed adjustment and infinitely variable working speeds up to 19kph.

Unlike hydrostatic transmissions in other telescopic handlers, which must handle power delivery from zero to top speed, the hydrostatic module in DualTech VT is optimised for low-speed response and controllability. As a result, it is quiet and smooth, as well as responsive and power-efficient.

In normal Drive mode, pressing the accelerator pedal influences both hydrostatic output and engine speed, with the control electronics balancing the two according to the driver's demands. Precision inching is available through the brake pedal – initial movement progressively disengages hydrostatic drive, giving the operator total control when pushing into a muck heap with no wear and tear on the brakes.

Engaging Flexi mode by pressing and holding the transmission down-shift button allows engine speed and ground speed to be controlled independently for the first time on a full-size Loadall.

An electronic hand throttle is used to select pre-set engine speeds – peak torque at 1500rpm, peak power at 2200rpm – or make adjustments in 100rpm increments. A dial adjusts maximum speed available from the hydrostatic drive between virtually

Turning original ideas into practical use

zero and 19kph.
The Flexi mode can be exploited for bulk handling and loading operations by setting the engine speed for optimum boom hydraulics performance, leaving the operator to regulate the handler's ground speed using the accelerator pedal and focus on steering and boom operation.
Adjusting a speed-regulating dial enables the operator to limit hydrostatic drive top speed and so optimise driving characteristics for short loading cycles and confined locations – an especially useful feature when loading a manure spreader from a cattle shed, for example.
Flexi mode also builds on the Vari-Speed feature of the fully hydrostatic JCB 525-60 compact handler to operate an attachment with hydraulic drive – such as a yard sweeper, straw spreader or feeder bucket.
In this situation, the engine speed is set to deliver the required amount of oil from the new 110-litre/min high-flow auxiliary hydraulics circuit and a low ground speed is dialled in to dispense feed or bedding material at the required rate.
A 'memory' feature in Flexi mode means the operator can resume full speed – to empty a sweeper bucket or collect another batch of feed – and then return to the chosen settings with just a couple of button presses.

Powershift drive

When a Loadall AGRI Pro telehandler accelerates beyond 19kph (11mph), whether in the field or on the road, the DualTech VT variable transmission automatically switches to its powershift system, where electronically modulated clutch packs make barely noticeable shifts between three mechanical gears up to the 40kph (25mph) top speed.
With no torque converter needed, direct drive in each gear makes the most of available torque to deliver quick acceleration, strong climbing ability and the impetus to maintain speed on road inclines.
The transmission will skip-shift down to the lowest ratio, ready to pull away after slowing for a road junction and will short-shift when accelerating with a light load. Also, the transmission can be restricted to gears one, two or three as appropriate for field work – gathering and loading bales, for example.

DualTech VT

Tim Burnhope

JCB EcoMAX engine

All three JCB Loadall AGRI Pro handlers are powered by the 4.8-litre version of JCB's EcoMAX diesel engine, developing 145hp (108kW) at 2200rpm and 560Nm (413lbf ft) of torque at just 1500rpm.
By optimising the drivetrain to utilise the EcoMAX engine's torque characteristics for different work and travelling situations, JCB say "DualTech VT transmission complements our expertise in engine and hydraulics performance and efficiency"
"Operators can fully capitalise on this by using the 'power' and 'economy' settings as appropriate – the former allows the transmission to exploit full engine revs and power output in both hydrostatic and powershift drive, while the latter puts a 1700rpm ceiling on engine revs in working gears, changes the engine's power delivery characteristics and initiates earlier up-shifts to use the least amount of fuel. The 'economy' mode typically reduces fuel consumption by more than 5% across an average agricultural telehandler duty cycle"
"As farming businesses become bigger and they operate on land distributed over a wider area, so the ability to travel quickly and efficiently between sites has become increasingly important," says Tim Burnhope.
"The DualTech VT transmission is a prime example of JCB's innovation and engineering strengths coming together to create the best of both worlds"

DOUGLAS BOMFORD TRUST

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Telephone: +44 (0)1234 750876
www.dbt.org.uk enquiries@dbt.org.uk
Secretary: Paul Miller
Administrator: Elizabeth Stephens

SPONSORED PROJECT

In April 2016, The Trust agreed to award Stuart Llewellyn a grant to travel to Peru to undertake voluntary work over a six-month period as part of the "Engineers without Borders" scheme. In September 2016, Stuart travelled to Playa Blanca in Northern Peru to join a team from the WindAid Institute working to provide electricity for a small fishing community. Below is an edited section of Stuart's report. *(Further details available from The Trust secretary if required).*

The community

"The villagers had previously used kerosene, it was cheap but then could no longer be sourced and candles were expensive. In 2005, some villagers were able to purchase diesel generators but these are extremely expensive to run - 5 soles (£1.20) a day. The municipality had installed some solar panels in (September 2014). However, there was no accompanying training in their use, so many ceased working. WindAid has been able to support those families a little in understanding how the panels work and there are now around a little more than half functioning in the village. The wind turbine and associated equipment (wind turbine controller, DC lighting circuitry and USB mobile phone charger) was gifted to families, on the agreement that the family pays into a community run maintenance fund. Previously, on average, families would spend 1 nuevo sol a day on candles, hence the figure of 30 nuevo soles (~£7.40) a month was agreed.

The families use the energy for lights; charging mobile phones and batteries. Some families also, at an additional cost, buy an inverter that allows them to use AC appliances such as radios, TV's and fridges."

"The relationship with the community is such that land was gifted to WindAid, in order to build a workshop facility in the community, where our teams could stay whilst deploying the wind turbines, and the hope was that local technicians would be involved in the manufacturing and maintenance processes in the medium to long term future."

What did I achieve during my placement?

"In the 6-month placement, I

was part of various volunteer teams that installed and commissioned 6 Wind Turbines with estimated 65 people directly benefiting from these systems."

Personal benefits

"Personally, I benefited from learning a whole new skill set with microcontrollers, and small portable computers. I learnt to 'stand on the shoulders of giants' - wealth of information available on this subject matter online, and to select parts that are suitable, adapt and implement for our purpose.

I constantly had to overcome seen and unforeseen problems and improved my networking skills, reaching out to other engineers on other placements, current and past.

Level of Spanish has improved massively, working with non-English speakers, and engage with community members.

I have decided to continue working in international development, I have been offered a position within WindAid."

www.windaid.org

AWARDS AND PRIZES

Cranfield University

The 2017 Douglas Bomford Trust Prize at Cranfield University for the best student on the Land Reclamation and Restoration course was awarded to Karolina Krystyna Golicz. Peter Redman, representing The Trust, presented the award at the Prize Giving ceremony on Friday 30th June 2017 – the same day as the Graduation Ceremony for the School of Water, Energy and the Environment at Cranfield University.

The Royal Agricultural University

The Douglas Bomford prize at The Royal Agricultural University for the best application of engineering to solve a problem in Agriculture, Food or the Environment was awarded to Harry Cotton. The prize was presented to Harry at a Prize Giving ceremony that for the first time was held as a separate event at the University on Thursday 21st July. Harry was something of a star performer at the University receiving a total of four prizes at the ceremony. The picture (below) shows Harry, Paul Miller and trustee Peter Redman together immediately after the presentation.

Membership Matters

MEMBERSHIP ENQUIRIES
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ETHICAL GUIDANCE FOR ENGINEERS

Revised set of principles published

The engineering profession has reviewed and launched a key document that provides guidance for engineers and technicians on ethical behaviour and decision-making.
The *Statement of Ethical Principles* for the engineering profession has been produced by the Engineering Council and the Royal Academy of Engineering. It sets out four fundamental principles that all engineering professionals should aspire to follow in their working habits and relationships.
The document was first published in 2005 and has been reviewed in 2017 to ensure that it remains current.
The principles are organised around four pillars: honesty and integrity; respect for life, law, the environment and public good; accuracy and rigour; and leadership and communication. Each of these is broken down further into a set of points on how engineers should behave, such as (taking one from each pillar): engineers should "avoid deception and take steps to prevent or report corrupt practices of professional misconduct"; "protect and, where possible, improve the quality of built and natural environments"; "perform services only in areas in which they are currently competent or under competent supervision"; and "challenge statements or policies that cause them professional concern".
An event to mark the publication of the revised document was held at the Royal Academy of Engineering on 11 July 2017, hosted by its President, Professor Dame Ann Dowling OM DBE CEng FRS FREng.
She says: "Engineering professionals work for the wellbeing and safety of our society so it is vital that they maintain and promote high ethical standards. They also have a responsibility to challenge unethical behaviour wherever they see it."
Professor Chris Atkin CEng FRAes, Chair of Engineering Council, highlighted the importance of the document for those supporting education, training and professional development.
He says: "With this clear statement of what it means to behave in

an ethically responsible way, the profession needs to ensure that the principles are embedded at all stages of professional development for engineers and those technicians, tradespeople, students, apprentices and trainees engaged in engineering. It is equally important for anyone who manages or teaches engineers to be aware of these principles, even if they themselves are not an engineer."
Full statement is available at: iagre.org/codesofconduct

INTELLECTUAL PROPERTY

Free workshop

IAgrE is collaborating with our Commercial Member Marks & Clerk to run a free workshop on Wednesday 1 November (4pm -6.30pm) at 90 Long Acre, London WC2E 9RA. The workshop will explore the basics and commercialisation of Intellectual Property.
Marks & Clerk is an international group of intellectual property service providers, encompassing patent and trade mark attorneys, lawyers and consultants. The company currently employs over 200 legal practitioners worldwide and over 500 other staff offering intellectual property protection, strategy, dispute resolution, commercial and valuation services to clients around the world.
Reserve your place
www.iagre.org/events/MCIP

World Agri-Tech Innovation Summit

October 17-18 2017 - London

In October 2017, the World Agri-Tech Innovation Summit returns to London for two days of networking and debate. Global agribusinesses, VC investors and technology start-ups from around the world come together to uncover the most exciting innovations in agricultural technology – and to forge the right partnerships to take those solutions to market. Attracting delegations from the US, Europe, the Middle East and Africa, this is a summit where connections are made: accelerating the transition of technology from the lab to the field.
IAgrE are once more partners at this event and thus Members are entitled to a saving of £300 per ticket. Visit www.worldagritechinnovation.com and add the code **iagre17** to obtain your discount.

PIONEERING TECHNOLOGY SPECIALIST INTEREST GROUP (PTSG)

Museum of English Rural Life, Reading
Saturday 20 May 2017
Report by William Waddilove

The Museum of English Rural Life, a department of Reading University and often referred to as 'MERL', reopened last October after a major development and this was an excellent opportunity for the PTSG to visit. We, as a special interest group, had previously visited in June 2001. Then the museum was in a group of 'porta-cabins' and staff were then looking forward to moving to this site.
A small group of us met at the museum and over our first cup of coffee confirmed the date of our previous visit printed on a branch programme card that a member had located.
Our guide Jenny was waiting for us as we arrived. She started the tour with a brief history in front of a special display encompassing all within the scope of the museum. The museum had started as a display at the Festival of Britain in 1951, the same year as The Archers started, and their Festival display had attracted considerable interest. This had led to visits to several agricultural shows and a collection being started and a semi-permanent display on the edge of the university's White Knights campus. After many extensions to this temporary museum, as its contents had grown, they were offered a building that had been used for student accommodation but was no longer suitable. However, it was in a very good position for the museum being more central and adjacent to other university buildings.
The displays cover all aspects of rural life from early practices to almost the present day. Great on horses but low on tractors! One gallery takes us though the seasons showing the wide range of items that used to be used in the country. Another gallery has a range of county and regional traditional designs of wooden farm carts. Certainly a place to slowly walk round with a friend reminiscing about all the tools you used to use or you saw your grandparents use.
It would have been good to have seen more members and their families coming (there was a special mouse hunt for children) and especially members from outside the West Midlands branch.

BELOW LEFT: Jenny our guide showing the range of exhibits to see
BELOW RIGHT: Museum view
BELOW: Stuart Martin *(who works for Jaguar/Land Rover)* ***getting excited by a very early Land Rover***

WESTERN BRANCH

Visit to Krone Forage Solutions
17 May 2017
Report by Mike Whiting

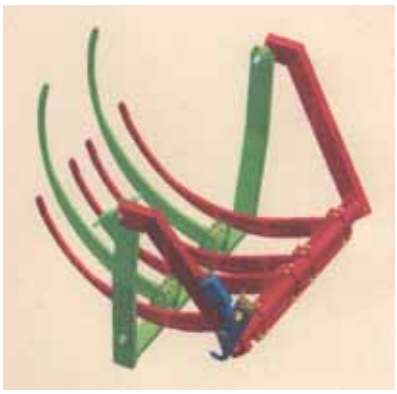
Nothing square about a visit to Krone Forage Solutions

On the 17th May the Western Branch of the IAgrE took a visit to Krone Forage Solutions at Dauntsey, Wiltshire courtesy of Simon Barnes at Barnes Agricultural services.
Here we were introduced to Mike Foyle, who explained this unique and effective business partnership. Quite simply Krone UK provide their full range of grass harvesting equipment into the existing technical support and servicing skills undertaken by Simon Barnes. Mike Foyle is the kingpin in ensuring the Krone brand is driven forward in the competitive marketplace of forage harvesters, balers, mowers, tedders and rakes.
Mike Foyle provided us with a history tour of the Krone family, from their roots in 1896 when the first generation of Bernard Krone was a blacksmith producing pasture drinkers. Moving through to the 1930's and the demand for mechanisation in agriculture prompted the design and development of implements, with the introduction of iconic machines such as the Optimat manure spreader. Fast forward to 2017 and the product portfolio includes 205 models all dedicated to the grass, maize and biofuel conservation market.
As the business is still family owned, their long term commitment to the market is evident with 47.8% of profits reinvested in 2016, with a robust turnover of €1,786 million.
Following on from the historical introduction, Mike explained in more detail the product range. The Big X Krone

forage harvester which is a stable mate for many large contractors was developed in 2000. This concept was the result of hard work and dedication from Krone's 330 development engineers based in Spelle, Germany. One of the key features of the Krone header is the lighter header which comprises of 4 gearboxes rather than the 16 employed within a German competitors red coated unit.
Moving on from the Big X, Mike gave us the cook's tour of the new workshop facility and explained the principal of the DLG Gold award winning "safe cut" system for the mowers. When the mower encounters an obstruction, a shear pin breaks rather than transferring the load to the spur gears. The pinion shaft keeps spinning, jacking up the disc in question and the moves it out of harm's way of other neighbouring units which are still rotating at phenomenal speed.
For those of you who have experienced opening up a large baler's panel door in harvest to be greeted by a labyrinth of dusty, oily chains, this isn't the case with the Big Pack units. Rather a sleek design on direct drive shafts with only one shear bolt protection included at the rear of the unit.
The Multi-Bale unit demonstrated Krone's ability to add value to the end product with the wafer sections individually bound, ideal for the equestrian market. A range of selections is available to the operator on the number of individual bales produced, and the use of different twine colours ensures the correct strings are cut!

The story doesn't end with the delivery of the machine to the farmer. Mike explained that of the 30 staff employed by Krone UK, 65% of them are in aftersales. Supporting them is the parts outlet in Leeds which holds 145,000 parts with a book stock value of £6.5 million.
An excellent visit enjoyed by all, including Kelechi Anyaoha who kindly travelled over from the Eastern IAgrE branch. We wish Mike Foyle and the Krone Forage Solutions team success with their business development.

BELOW LEFT: Krone Big Pack
BELOW: Krone Multi-Bale



WREKIN BRANCH

BRANCH TECHNICAL MEETING
16 May 2017
Report by Bill Basford

The Pressure's on Tyres
Minimising soil compaction is probably the most important factor contributing to soil health whilst using machinery. This was confirmed by Bruce Lauder from Trelleborg Wheel Systems and Nick Constantine from Tractair when they joined forces to describe tyre choice and on board inflation equipment use.
Describing differences in soil compaction through correct tyre choice Bruce highlighted that the first pass over the ground was responsible for the majority of all compaction found in that route. Using a tyre selection chart or app was described as key to dealing with high axle loads and maximising tyre footprint, various examples being used, some which offered 36% increase in footprint area. Reduction in compaction was indicated as potentially between 60-70% from correct tyre and inflation choice. This in turn offered greater tyre lug engagement maximising the tyre flexibility offered with towards 35% less slip, higher pulls, reduced rolling resistance, increased forward speed with lower fuel use.
These aspects were confirmed through video presentations of practical evaluations of identical tractor / cultivator use, the only variables being tyre pressures. These trials using the correct tyre inflation pressure showed, in a variety of situations to afford 17% improvement in speed and 14-17% fuel savings with no detriment to work quality but savings over hourly, daily and seasonal performance and therefore timely operations. Water porosity studies also confirmed much slower water movement following scant attention to correct tyre selection and inflation. Economics of performance advantages were discussed contributing to overall benefits in addition to benefits from lowering compaction.
Trelleborg's recent launch of a 'ProgressiveTraction™' tyre type was described offering greater contact area from steps on the lug sides, again showing 7% time and 7-9% fuel savings.
Concluding his presentation Bruce outlined the newly launched Trelleborg VIP (Variable Inflation Pressure) system offered for harvesters in the main, this system then lead easily into the Tractor on board systems offered by Tractair.
Nick Constantine, Tractair linked his presentation of on board tyre inflation systems (CTIS) being a natural development for the company with its tractor trailer air braking systems. He stressed all the benefits discussed from Trelleborg's inputs to the evening whilst showing both retro and original equipment use easily permitted operator's optimum pressure selection.
He outlined most peoples immediate reactions to the retro fit external airline pipes but stressed in use that these have not been problematical with few issues reported. Stressing that Tractair's systems had now been in use successfully for several years he outlined the need for large bore tyre valves and that the axle rotational valves are not under pressure until pressuration is allowed by a pilot airline actuation opening the main valve.
Questioned on costs he suggested that payback times could be within 1-2 years on the functional tractor use of improved performance, fuel savings etc. To this could be included savings on a reduced need for compaction alleviation etc. and improved yields etc.
Questions followed easily where previous WW11 use of on board inflation systems such as with the US DUKW and Russian vehicles was noted. Both presentations offered good interchange of ideas in application and development and underlined the effective use of correct tyre selection suiting current high power units engaging with and supported by our fragile soils.

Trelleborg Road Show

BELOW: Trelleborg Progressive tyre

CABS, HITCHES, AXLES – AND EELS

Members of IAgrE's Northern Ireland branch have enjoyed a varied programme of visits during 2017

VISIT TO C AND G ENGINEERING

C and G Engineering Ltd , Clane, Co Kildare specialise in the design and manufacturing of safety cabs for a wide range of vehicle types for agriculture, materials handling, construction, municipal and recreational applications. The company employs 22 people and is still a family business. We were welcomed by William Ganly (Managing Director) who described the company's origins in 1977 as an agricultural machinery dealership.

In 1985, C and G began manufacturing safety cabs to fit Massey Ferguson and Ford agricultural tractors of the 1960s, 70s and 80s. The same C and G cabs are still in production as many of the tractors of that era are still at work or being restored. It was interesting to see a new TAFE 35D tractor (built in India with very similar design and appearance to earlier Massey Fergusons) being matched to a new cab. In 2010, C and G commenced a contract with AGCO to make and supply replacement cab doors for the Massey Ferguson 300 and 600 series. This contract now also extends to cab doors for more recent MF tractor ranges.

The C and G product range has extended to include cabs for site dumpers, forklifts, telehandlers as well as construction and municipal vehicles. Most of the current production is to supply original equipment manufacturers such as Thwaites, Terex, NC, Ausa, Hyster, Moffett, Neuson and Lifton. We saw examples of cabs, all all stages of production, for many of these brands on the site.

Evidence of the range of vehicles on site for cabs, during our visit, also included a Bradhaw golf buggy, a Moffett Mounty forklift and both Cat and Atlas Copco road pavers. The latter's cab was fitted to its powered base for offset to either side so that the operator has a clear view for accurate road laying. We are most grateful to Mr Ganly and his staff for making us so welcome.

LEFT: William Ganley with IAgrE group
RIGHT: Cab structure for TAFE tractor

AGM AND PRESIDENT'S VISIT

IAgrE President Dr Robert Merrall attended the Annual General Meeting of the Northern Ireland Branch at Cookstown, Co. Tyrone. As well as providing an update on the business of IAgrE and its membership, Dr. Merrall delivered a presentation on the subject of 'Agricultural engineering research in the modern world' describing how technology is being developed and advanced across the UK's agri -food sector.

He said "Against the background of the strategic and economic importance of the agri-food industry, the UK Government has several current initiatives to encourage the emergence, integration and development of new technology. Within this the use of electronic monitoring, computer analysis / mapping and use of robots are important new frontiers"

He added that Innovate UK was set up as part of the UK Strategy for Agricultural Technology with public funding to provide support for products, processes and services with new commercial potential.

The Agri-EPI (Engineering Precision Innovation) Centre is one of four Agri-Tech innovation centres managed through Innovate UK. It is a limited company jointly owned by Scotland's Rural College (SRCU), Cranfield University, Harper Adams University and 3 commercial companies within the agr-food industry and supported by more than 75 companies by contact and feedback including major supermarkets, farmers, food processers, technology services and agricultural equipment manufacturers.

BELOW: Dr Merrall with President Padraig O'Kane

VISIT TO GRANNING AXLES

At the headquarters of Granning Axles at Naas, Co.Kildare, we were welcomed by Mr Brian Walsh (sales manager) and Mr Paul Edwards (commercial manager). Although we knew that Granning supplies axles to Northern Ireland based trailer manufacturers we were not aware of the origins and extent of its commercial activities. It had originally built commercial trailers before specialising, from around 1990, in the design and manufacture of its own axle, suspension and sub-frame bogie systems. It has its own in-house engineering and design team developing products in compliance with EU and other market standards. In addition to its own product lines, the company is UK and Ireland agent for WABCO braking

We were able to see the internal details of the various axle types on actual cut-away examples. Granning use these for display at agricultural shows and other exhibitions. The types range from the basic (only suitable for agricultural trailed equipment travelling at up to 32 kph) to those meeting the latest standards for trailers towed by 40kph / 50kph tractors. They provide superior braking efficiency due their size and design features including "S" shape cams for more progressive controlled braking effort.

The same types of axles and brakes are also used on HGV trailers but with three-line air braking and features such as ABS (Anti Lock Braking Systems) and EBS (Electronic Braking Systems). The latter reacts to load sensing in the air bag suspension units and supports a range of features including anti- lock braking and vehicle stability control on the road.

Granning build the above types of new axles as well as supplying all the parts to build and service suspension/ braking systems for all types of HGV. This includes additional and replacement axles for existing trucks to comply with various gross vehicle weight specifications. The Airsprings spares business supplies a wide range of new and refurbished items.

The company also designs and builds heavy-duty bogies on which equipment for mining, quarrying and recycling applications can be mounted.

Our visit concluded with a most enjoyable and informative technical discussion around the range of products and services available.

BELOW LEFT: Brian Walsh (left) with group
BELOW: Group at Granning

DROMONE ENGINEERING
Dromone Engineering is a well known manufacturer of tractor pick-up hitch technology and excavator coupler technology. The company employs 120 people at Oldcastle,Co Meath. We were welcomed there by Mr Patrick Duffy (Agriculture product manager) who told us how the company had started making replacement parts for tractors 35 years ago before going on to develop and manufacture its own new designs for pick-up hitches. Dromone is now known worldwide as a designer, manufacturer and supplier of hitch systems to main tractor brands across the world for the last 35 years. The pick-up hitch market is strongest in countries where weight transfer trailers are used as in the UK and Ireland and as far away as New Zealand. Dromone Engineering is now represented on regulation committees setting standards for product designs within the EU and worldwide.
The innovative push-back pick-up hitch was developed by Dromone from 1991. The hook is extended hydraulically, to assist vision and accuracy by the driver, as the trailer is lifted before being pulled forward for automatic latching below the tractor axle. Original Equipment Manufacturers (OEMs) supplied include Massey Ferguson,Valtra, Same Deutz Fahr, Kubota, Volvo and Claas. Dromone is also well known for its quick coupler technology for excavators. Its current overall market sector is divided around 50% for agriculture and 50% for industry.
Dromone is also now well established in manufacturing the ball and spoon system. This consists of an 80mm diameter ball replacing the hook and the trailer drawbar having an inverted spoon in place of the ring. A keeper locks it automatically when the trailer is lifted. The advantages for larger towed trailers include a smoother ride due to less shock loads in the system, reduced wear and being more secure when tipping a trailer. During our visit, one of the latest Deutz- Fahr tractors was present for test fitting of a new hitch design.
Although the primary focus of our visit was on the range of tractor hitches we also saw the components and processes for the Dromone range of multi-lock quick couplers for excavator buckets. These were first introduced in 2000 and, in addition to the home markets, are exported worldwide especially to North America.

BELOW LEFT: IAgrE group at Dromone
BELOW: Dromone hitch

VISIT TO LOUGH NEAGH FISHERMEN'S CO-OPERATIVE
Branch members and friends enjoyed a visit to the Lough Neagh Fishermen's Co-operative at Toomebridge. The group was welcomed by Mr Pat Close (the Co-operative's Chairman and Chief Executive) who described the its history and role. The wild eel fishery in Lough Neagh is the largest in Europe and has been active for at least 200 years. Lough Neagh is the largest freshwater lake in the UK / Ireland and the 3rd largest in Europe. The Lough has a surface area of 156 square miles (100,000 acres) and an 80 mile long shoreline. It lies in the centre of Northern Ireland and collects 47% of the surface water run-off through the six major rivers which flow into it.

Eel fishery
The traditional fishery, as carried on by local families for more than 200 years, is now a managed resource to conserve stocks and maintain a sustainable business. The bed of the Lough is owned by Shaftestbury Estates, and from 1925 the fishing rights were leased to Toome Eel Fishery (NI) Ltd. Lough Neagh Fishermen's Co-operative Society Ltd. was formed in 1963 to manage the fishing rights. The Co-operative has 620 shareholders, a management committee and a board of directors. It acquired outright control of the fishery by 1972 and around 220 fishermen hold licences to fish for eels on a seasonal basis. The Co-operative members currently harvest and market around 300 tonnes of Brown Eels and up to 80 tonnes of Silver Eels each year.

Around 100 boats (all less than 8.4 metres long) from the local fishing communities fish for Brown eels on the bed of the lough, using either long-lines (long nylon fishing lines with over 300 baited hooks) or a large draft net (up to 82 metres long) during the permitted May to October season. Trawling is not permitted. The boats work on a 5-day week limit with a 120 lb daily quota. Eels of less than 40cm must be returned to the lough. They are graded and packed there before being flown live, the same day, to clients in continental Europe and the UK. Around 80% of the 400 tonnes marketed annually go to outlets in Holland and Germany to become whole smoked eel or smoked eel fillets. About 20% of the catch is marketed through Billingsgate for processing as jellied eels.

MEMBERSHIP CHANGES

ADMISSIONS

Member
Moulding S W (SE Midlands)
Hill K R (Western)

Associate Member
Ingram DJ (West Midlands)

Affiliate
Ventris C (Southern)
Young J (East Midlands)

STUDENT
Cranfield University
Rubio-Lopez F

Coleg Sir Gar
Bagshaw H
Bambry L M P
Davies H J
Davies L J
Davis D T
Griffiths D A
Harries D G
Harvey M
Hill J
Hughes D R S
Jones S
King E
Love G T
Morgan A L
Thomas J
Thomas O E
Walters M

Loughborough University
Forbes A

Harper Adams University
Cao
Cheng M
Gui
Li
Liu
Luo C
Luo L
Wang W
Xie R
Xu
Yang
Yang S
Zhao D

Lancaster University
Wallace E E

Queens University Belfast
Mathew N A

Tralee, Institute of Technology
Barron T
Byrne D
Curran S
Feerick S
Fortune J
Funchion A
Gilligan J
Kennedy G
Lenehan J
McCabe D
Quane B
Regan S
Williams T

University of Dublin
French M

READMISSION

Helen WA IEng MIAgrE (Southern)
Hunt IM MIAgrE (Western)

DEATHS

We have recently learned of the death of the following member and we send our condolences to his family and friends:
Mr R D S Barber FIAgrE (East Midlands) a member since 1954

TRANSFERS

Fellow
Higginson GP (Wrekin)

Member
Whatoff DGJ (South East Midlands)

Associate Member
Scott R (Northern Ireland)
Clarke B (Yorkshire)

ENGINEERING COUNCIL REGISTRATIONS

CEng
Andrews MA (Yorkshire)

IEng
Copnall S (Wrekin)

IEng
Scott R (Northern Ireland)
Moulding SW (SE Midlands)

LONG SERVICE CERTIFICATES (1 JULY – 30 SEPTEMBER 2017)

IAgrE extends warm congratulations to the following members on reaching significant milestones.

Name		*Date of Anniversary*
50 Years		
Robert Wyper McMath Stewart	MIAgrE	27-Jul-17
Anthony Noel Curry	MIAgrE	27-Jul-17
David Keith Morris	MIAgrE	27-Jul-17

Name		*Date of Anniversary*
35 Years		
David Kipkosgei Korir	MIAgrE	01-Jul-17
Terence John Southcott	MIAgrE	03-Jul-17
David Irvine McAllister Elder	MIAgrE	13-Jul-17
Christopher William Watts	FIAgrE	23-Aug-17
Shaun Douglas Rawson-Smith	AIAgrE	23-Sep-17

Name		*Date of Anniversary*
25 Years		
Evaristo Chando Mubaya	MIAgrE	08-Aug-17
David Andrew Butter	AMIAgrE	07-Sep-17

ACADEMIC AND COMMERCIAL MEMBERS

ACADEMIC MEMBERS

Berkshire College of Agriculture
Hall Place
Burchetts Green
Maidenhead
Berks SL6 6QR

Bishop Burton College
York Road
Bishop Burton
Beverley HU17 8QG

Brooksby Melton College
Asfordby Road
Melton Mowbray
Leics LE13 0HJ

Coleg sir Gar
Gelli Aur Campus
Llandeilo
Carmarthenshire SA32 8NJ

Cranfield University
Cranfield
Bedfordshire MK43 0AL

Duchy College
Stoke Climsland
Callington
Cornwall
PL17 8PB

Easton & Otley College
Easton
Norwich
Norfolk, NR9 5DX

Greenmount College
CAFRE
22 Greenmount Road
Antrim,
Northern Ireland BT41 4PU

Harper Adams University
Newport
Shropshire TF10 8NB

Institute of Technology
Tralee
Clash,
Tralee
Co Kerry, Ireland

Lincoln Institute of Agri-Food Technology,
Lincoln University
Lincoln LN6 7TS

Myerscough College,
Bilsbarrow
Preston
Lancashire PR3 0RY

Newcastle University
King's Gate
Newcastle Upon Tyne NE1 7RU

Pallaskenry Agricultural College
Co Limerick
Ireland

Plumpton College
Ditchling Road
Lewes
East Sussex, BN7 3AE

Reaseheath College
Reaseheath,
Nantwich, Cheshire, CW5 6DF

Royal Agricultural University
Cirencester
Gloucester, GL7 6JS

Sparsholt College
Sparsholt,
Winchester SO21 2NF

SRUC – Auchincruive
Auchincruive Estate
Ayr, KA6 5HW

Wiltshire College Lackham
Lacock
Chippenham
Wiltshire SN15 2NY

COMMERCIAL MEMBERS

Agricultural Engineers Association (AEA)
Samuelson House,
62 Forder Way,
Hampton, Peterborough, PE7 8JB

AGCO Ltd
Stoneleigh, Abbey Park,
Kenilworth, Warwickshire, CV8 2TQ

Alvan Blanch Development Co,
Chelworth,
Malmesbury, Wiltshire SN16 9SG

Autoguide Equipment Ltd
Stockley Road , Heddington
Calne, Wiltshire, SN11 0PS

BAGMA
Middleton House,
2 Main Road, Middleton Cheney,
Banbury, Oxon, OX17 2TN

Bomford Turner Limited
Salford Priors
Evesham, Worcestershire WR11 5SW

City & Guilds
1 Giltspur Street
London EC1A 9DD

City Farm Systems Ltd
25 Hepplewhite Close
High Wycombe
Bucks HP13 6BZ

David Ritchie (Implements) Ltd
Carseview Road, Suttieside,
Forfar, Angus, DD8 3EE

Douglas Bomford Trust
The Bullock Building
University Way, Cranfield
Bedford, MK43 0GH

DSL Systems
Adbolton Hall, Adbolton Lane
West Bridgford,
Nottingham NG2 5AS

FEC Services
Stoneleigh Park
Kenilworth , Warwickshire CV8 2LS

Fullwood
Grange Road
Ellesmere , Cheshire SY12 9DF

HSS Hire
Head Office
25 Willow Lane,
Mitcham, London CR4 4TS

John Deere Ltd
Harby Road, Langar
Nottinghamshire NG13 9HT

Marks & Clerk LLP
90 Long Acre
London WC2E 9RA

Mastenbroek Limited
83 Swineshead Road
Boston, Lincs, PE21 7JG

Shelbourne Reynolds
Shepherds Grove Ind. Est.
Stanton, Bury St Edmunds
Suffolk, IP31 2AR

SSAB Swedish Steel Ltd
Narrowboat Way
Hurst Business Park
Brierley Hill
West Midlands DY5 1UF

TeeJet London Ltd
Headley House,
Headley Road, Hindhead,
Surrey, GU26 6UK

Witham Oil and Paint Ltd
Outer Circle Road
Lincoln LN2 4HL

FORTHCOMING EVENTS

IAgrE EVENTS

Wednesday 11 October 2017
IAgrE CONFERENCE 2017
Decarbonising UK Agriculture
RoCRE Rothamsted. Harpenden, Herts AL5 2JQ
Full conference information and programme in this issue

Thursday 19 October 2017
IAgrE AUTUMN COUNCIL MEETING
Lincoln University, Riseholme Park, Lincoln LN2 2LG

Tuesday 20 March 2018
2018 IAgrE Young Engineers Competition
Perkins Engines, Peterborough

All enquiries regarding IAgrE Events. Contact Sarah McLeod. Tel: 01234 750876
secretary@iagre.org

BRANCH MEETINGS 2017-2018

EAST MIDLANDS
CONTACT: Richard Trevarthen
01509 215109
richard.trevarthen@gmail.com

Tuesday 10 October 2017 7pm
Visit to Witham Oil and Paint, Lincoln
Outer Circle Road, Lincoln LN2 4HL

Tuesday 14 November 2017 7.30pm
Stilton: Britain's Historic Blue
Talk by Kim Kettle, Production Manager,Long Clawson Dairy
Canal Farm - Vintage Centre, Langar Lane, Harby, Leics, LE14 4BL

Tuesday 12 December 2017 7.30pm
Visit to N J Froment & Co Ltd
Cliffe Road, Easton on the Hill, Stamford, PE9 3NP.

Tuesday 9 January 2018 7.30pm
Engineering Excellence: 50 years of Land Rover
Speaker: John Holland, Head of the Jaguar Land Rover Way.
Quorn Lodge Hotel, 46 Asfordby Road, Melton Mowbray, LE13 0HR

Tuesday 13 February 2018 7.30pm
Visit to Howard Marshall Engineering
Barracks Farm, Forest Lane, Papplewick Nottingham, NG15 8FG

Tuesday 13 March 2018 7.30pm
Visit to Chandlers Farm Equipment
Main Road, Belton, Grantham, Lincs, NG3 2LX.

Tuesday 20 March 2018 7.30pm
AGM and Annual Dinner (Partners are invited)
Quorn Lodge Hotel, 46 Asfordby Road, Melton Mowbray, LE13 0HR

NORTHERN IRELAND
CONTACT: Ian Duff
028 8673 6977 duffi@iagre.biz

Thursday 2 November 2017
Massey Ferguson: The first 60 years and beyond
Speaker: Campbell Scott, Director Marketing Service, Massey Ferguson
Venue CAFRE Greenmount Campus

Tuesday 14 November 2017
Robotics in Agriculture – opportunities and constraints
Speaker: Dr Debbie McConnell
AFBI Hillsborough

January 2018 (tbc)
Plant Hire: How and Why it works
Speaker - Keith McIvor, Director, KDM
CAFRE, Loughry Campus

Tuesday 13 February 2018 7.30pm
Meeting customer requirements for horticulture produce
Speaker: William Gilpin
Gilfresh Facility, 56 Creenagh Rd, Loughgall, Armagh BT61 8PZ

March meeting (tbc)
AGM and CAFRE Landbased engineering courses
CAFRE Greenmount Campus

SOUTH EAST MIDLANDS
CONTACT: John Stafford
01525 402229
john.stafford@silsoe-solutions.co.uk

Monday 9 October 2017 7.30pm
Harvest Technology
Speaker: Richard Jones, Astwell Augers Ltd
Meeting Room, The George Inn, 6 George St, Maulden, MK45 2DF

Monday 6 November 2017 7.30
Tea Manufacturer in Plantations: from Bush to Packet
Speaker: Dave Sharp of Unilever
Meeting Room, The George Inn, 6 George St, Maulden, MK45 2DF

Monday 11 December 2017 7.30pm
Driverless Tractors
Speaker: Ross MacDonald, CNH Industrial
Cranfield University (tbc)

Monday 15 January 2018 7.30pm
3D Printers and Ag Technology
Speaker: Stewart Williams, Cranfield University
Cranfield University (tbc)

Monday 5 February 2018 7.00pm
AGM and Student Presentation
Maulden Church Hall, Church Street, Maulden MK45 2AU

Monday 5 March 2018 7.30pm
Pea Harvester Technology
Speaker: Robert Plant, PMC Harvesters
Maulden Church Hall, Church Street, Maulden MK45 2AU

Monday 9 April 2018 7.30pm
'Electricides': Benefits and commercialisation of electric weed control
Speaker: Dr Mike Diprose, RootWave 'Electricides'
Maulden Church Hall, Church Street, Maulden MK45 2AU

May meeting (tbc)
Visit to PGRO and Sacrewell
Great North Road, Peterborough

WEST MIDLANDS
Contact: Ian Moore
0121 704 5700 ianw@whale.co.uk

Tuesday 14 November 2017 7.30pm
Visit to GreenMech Ltd
Presentation by Tony Turner
Kings Coughton, Alcester, Warwickshire, B49 5QG
Other dates to follow

WESTERN
Contact: Mike Whiting
07751 345580
mike.whiting@newmac.org.uk

Wednesday 27 September 2017
Tour of Thatchers Cider Farm (Myrtle Farm)
Meeting at Railway Inn, Sandford at 11am

Wednesday 18 October 2017 7.30pm
UK Approach to Precision Agriculture
Speaker: Professor Jane Rickson, Cranfield University
Royal Agricultural University, Cirencester

Wednesday 22 November 2017 7.30pm
Extreme Engineering: Life and Times with the British Antarctic Survey
Speaker: Andy Spearey.
The Greyhound, Bromham (tbc)

Wednesday 24 January 2018 meeting
SKF visit, Visit to SKF aircraft bearing manufacture at Clevedon followed by a visit to Oakham Treasures at Portbury.

Wednesday 14 March 2018 7.30
Western Branch AGM and Torqueing Power - *Future of the development of diesel engines*
Royal Agricultural University, Cirencester

WREKIN
Contact: David Clare
01952 815087
dclare@harper-adams.ac.uk

Tuesday 19 September 2017 7.30pm
Membership Workshop
Want to progress your IAgrE membership or looking for a mentor?
Board Room, Agri-EPI Centre, Harper Adams Hub

Tuesday 10 October 2017 7.00 for 7.30pm
Technical Meeting Vicon FastBale Baler
Speaker: Tim Baker, Product Manager, Keverneland Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 14 November 2017 7.30pm
Technical Meeting
Hands-Free Hectare: What have we found?
Speaker: Kit Franklin of Harper Adams University Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 12 December 2017 7.30pm
Technical Meeting *The Welding Institute*
Speaker: Professor Chris Dungey of TWI
Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 23 January 2018 7.30pm
Technical Meeting
Presentation on JCB's Hydradig wheel excavator. Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 20 February 2018 7.30pm
Technical Meeting
Lubication: Brief introduction for agricultural engineers
Speaker: Gregory Hunt of Librizol
Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 20 March 2018 6.30pm
AGM and Getting the best from agrochemicals
Speaker: James Thomas of Syngenta
Agricultural Engineering Innovation Centre, Harper Adams University

Tuesday 17 April 2018 7.30pm
Technical Meeting
Heico-Lock Tension controlled fasteners
Agricultural Engineering Innovation Centre, Harper Adams University

Tuesday 15 May 2018
Technical meeting (tbc)
Agricultural Engineering Innovation Centre, Harper Adams University

Dates and details are correct at time of going to press.

Further information and updates on www.iagre.org

24/7 Out of Hours

This issue, we introduce a new feature looking at the hobbies and past-times of IAgrE members when not engaged in their day-jobs. CHRIS BIDDLE REPORTS

RICHARD'S REBEL RACERS RELIANT ON ROBIN

IAgrE stalwart, Richard Trevarthen IEng, FIAgrE, is hooked on a specialist brand of stock car racing and together with his sons Mark and Ian runs a team in the Rebels series at meetings held most weekend at venues across the country. An engineering lecturer at Brooksby Melton College since 1969 until his retirement, Richard ran John Deere's AgTech and TurfTech apprenticeship programmes for many years and was responsible for developing engineering.

Richard, where did this interest start?
When they were growing up, I wanted to make sure my sons Mark and Ian, took an interest in a sport or active pastime. We had a go at most things, cricket, rugby, football but it wasn't until we decide to go to a stock car meeting one weekend at Long Eaton, now sadly defunct, and bingo we were hooked. I think they were 9 and 7 at the time.

What was it that grabbed you?
Oh, it was the noise, the speed and the fun that the competitors obviously had in navigating a crowded track. Something hooked us that afternoon and we began to attend meetings regularly. It was also clear that here was a motor sport that didn't necessarily need big bucks to take part. Yes, the top class, Formula 1 stock car (often fitted with 600+hp engines), needed more of a financial commitment (and space, as it is a big car) but there were other classes that could engage those with more modest budgets who just wanted the thrill of taking part.

How did you start?
We soon decided we couldn't afford Formula 1 but had the opportunity to buy a specially built Formula 2 car fitted with a Ford Pinto engine in which we started competing some 20 years ago. Years later, Mark started working in the US and we had to put competing on the back-burner. However, when he returned we decided to compete in the very popular Rebels series. So he sold his F2 and purchased a second hand Rebel. Interestingly enough, this meant he joined brother Ian on the tracks as Ian, who has not the facility to keep his own car, had for the past 14 years, five or six times a season, hired a Rebel as and when he could race.

Tell me about the Rebels
Rebels racing started in 1994 when a stock car enthusiast, Hans Kirimaa had an idea to produce a contact racing series with the need for as little repair equipment as possible. All the cars are of an identical spec and built at the Rebels Racing Engineering production unit near Burton on Trent. The chassis is a 5/8th replica of the Ford Popular which is then custom painted and sign-written to the owners requirements – and to stand out in a crowded field.

How are the cars powered?
Are you ready for this? All the cars are fitted with a Robin Reliant 850 all aluminium engine producing over 50 hp at 7500 rpm making them very quick and very competitive. They also have the same basic trailing arm and rubber block suspension, so with identical specs the drivers skill, determination, mixed with slices of luck come into play during races.

What about the racing itself?
We race on a quarter mile tarmac or occasionally shale oval, with normally 30 to 40 cars on track per race reaching speeds of around 55 mph on the straights. To add to the interest, drivers gain points during the season and are graded. The grades are displayed via the colour of the roof (blue, black, yellow, red etc) so that spectators can identify the quickest (and slowest) drivers. But unlike motor racing and the qualifying system, here the quickest drivers start at the back of the grid for each race.

So there is a lot of contact, how safe is the sport?
Yes, it is designed as a contact sport, but it is has one of the best safety records. In the past, some drivers have tried to bury opponents in the safety fence, but although you do get a few hot-heads, the organisers soon stamp on reckless driving and will have a 'quiet word'.

How often do you compete and where?
Most weekends during the season, Mark and Ian compete at venues such as Skegness, Buxton, Birmingham and Northampton, all of which have an enthusiastic stock car following. The Rebels crowd are a friendly bunch, we all help one another at meetings, have social events and get great enjoyment from the sport.

Thank you Richard. If you want to know more about Rebels racing or details of future meetings www.rebelsracing.com

BOOKING NOW OPEN

NEW HOLLAND AGRICULTURE · CNH INDUSTRIAL · m&c Marks&Clerk · The Douglas Bomford Trust

IAgrE

2017 LANDWARDS CONFERENCE

WEDNESDAY 11 OCTOBER 2017

Rothamsted Centre for Research and Enterprise, Harpenden, Hertfordshire

RoCRE Rothamsted Centre for Research & Enterprise

DECARBONISING UK AGRICULTURE

Perspectives and Policy for Change

SUMMARY

The carbon footprint of agriculture is complex. At one end, tractors and machines are big energy users, whilst natural resources such as forests and the soil can be managed to capture carbon.

The conference will address the policies and practices, the correct approach and the technologies required if reliance on carbon is to be reduced.
The event is aimed at engineers, scientists and technologists, farmers, growers, producers and for those working in policy and sustainable development.

OUTLINE PROGRAMME

Conference opens at 10.00 (Registration from 9.30). Closes 16.00

Welcome and Introduction: Dr Robert Merrall, President IAgrE
Agriculture and the Low Carbon Economy: Dr Jonathan Scurlock (National Farmers Union)
The Energy Independent Farm: Carlo Lambro (President, New Holland Agriculture)
Transport Free Supply Chains: Jonathon Lodge (City Farm Systems)
Soil! Our Natural Capital: Professor Jane Rickson (Cranfield University)
Energy Crops and Carbon Reduction: Dr Ian Shield (Rothamsted Centre for Research and Enterprise)
Insight into Work of Rothamsted: Chris Watts and colleagues from Rothamsted

FURTHER INFORMATION

Online: www.iagre.org/conference-2017
E-Mail: secretary@iagre.org Telephone: 01234 750876

BOOKING AND COST

Delegate £120. Retired £75. Student £40 (all plus VAT)
Booking: www.iagre.org/conference-2017