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Gathering winter fuel

Harvesting the willow 'hedges' at Wakelyns Agroforestry. More on p14-15.



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Organic Research Centre Bulletin

No. 114 – Winter 2013



News in brief

Agroforestry should be scaled up says UNEP report

The Emissions Gap Report 2013, involving 44 scientific groups in 17 countries and coordinated by the UN Environment Programme (UNEP), was published in early November ahead of the latest Climate Change Conference in Warsaw. Should the global community not immediately embark on wide-ranging actions to narrow the greenhouse gas emissions gap, the report says, the chance of remaining on the least-cost path to keeping global temperature rise below 2°C this century will swiftly diminish and open the door to a host of challenges.

This year's report pays particular attention to the agriculture sector as, although few countries have specified action in this area as part of implementing their pledges, estimates of emission-reduction potentials for the sector range from 1.1 GtCO₂e to 4.3 GtCO₂e. The report outlines a range of measures that not only contribute to climate-change mitigation, but enhance the sector's environmental sustainability and could provide other benefits such as higher yields, lower fertiliser costs or extra profits from wood supply. Three key practices that should be scaled-up more widely are highlighted:

- Agroforestry. This consists of different management practices that deliberately include woody perennials on farms and in the landscape, and which increase the uptake and storage of CO₂ from the atmosphere in biomass and soils.
- No-tillage practices. No-tillage refers to the elimination of ploughing by direct seeding under the mulch layer of the previous season's crop. This reduces emissions from soil disturbance and use of farm machinery.
- Improved nutrient and water management in rice production. This includes innovative cropping practices that reduce methane and nitrous oxide emissions.

European support for agroforestry

The European Parliament is supporting a pilot project entitled 'Towards an integrated European agroforestry sector.' With a budget of €1 million, this project will enable new European initiatives paving the way for genuine ownership of agroforestry by farmers.

The pilot project is meant to provide answers to the overall lack of information and support for farmers with respect to the various options of agroforestry applications. Raising awareness in the agricultural world about the multiple benefits of agroforestry, bringing together available and state-of-the-art knowledge, and involving farmers in improving agroforestry practices while sharing knowledge are among the objectives of the project. After the vote in October by the European Parliament (Plenary Session) on the EU budget for 2014, the European Commission will have to decide on the ways to allocate funds.

Dormice at Elm Farm

In November we carried out a dormice survey as part of a pilot project (TWECOM) at Elm Farm looking at harvesting wood fuel from hedges. The nearest records held by the

Thames Valley Environmental Records Centre listed dormice in Inkpen in 2010/11. The survey at Elm Farm involved a group of volunteers searching for hazelnuts that have been gnawed by dormice, in the hazel-rich hedges that were identified in our summer hedgerow surveys. The good news is that we found a number of gnawed nuts that have been confirmed as having been chewed by dormice.

International symposium on organic greenhouse horticulture

The 2nd International Symposium for Organic Greenhouse Horticulture was held in Avignon (France) during the last week of October. It was organised by the International Society for Horticultural Science (ISHS), the COST Action FA1105 BioGreenhouse, as well as ITAB and GRAB, two major institutes for organic horticulture research in France. Over 120 people from various countries all over the world attended this symposium which discussed the main aspects of organic protected cropping such as propagation material, soil health, plant nutrition and water management, as well as composting, management of diseases and pests, plant resilience and robust systems, energy saving and the standards for organic greenhouse production. More information about the symposium and selected presentations/summaries can be found at www.biogreenhouse.org/ogh-symposium

Second round of Duchy Originals research funding

The Soil Association announced in November the second round of research funding under the Duchy Originals Future Farming Programme. Researchers must team up with farmers or growers to design their projects, and applications are peer-reviewed by producers as well as by scientists. Proposals were invited that address one of three key challenges for organic and low-input agriculture:

- Managing weeds without herbicides. Solutions could include new approaches to weed control, reducing weeds' impact on yield or even finding novel uses for weeds.
- Affordable high-quality protein feed for poultry, pig and fish farming, for instance from insects, algae or by-products. The fund will support research that adds significantly to other current projects to address this crucial issue.
- Growing even healthier food. What practical steps can farmers and growers take to enhance the nutritional quality of their produce?

These were among the priorities that producers raised in workshops and a survey run by the Organic Research Centre. The competition closed in early December and the winners will be announced in January.

For more details on items on this page, visit the News link at www.organicresearchcentre.com or, to receive more frequent updates, register for our E-bulletin service and follow us on Facebook and Twitter (all on our homepage).



About us

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The Organic Research Centre

is the UK's leading, independent research organisation committed to developing sustainable land management and food production systems based on IFOAM organic/agro-ecological principles; disseminating knowledge to current and future farmers/land managers and other related businesses; compiling evidence on systems performance and informing public debate through communication with policy makers and opinion leaders, and through them the wider public, in order to ensure the health and well-being of soil, plant, animal, people and the environment.

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Editorial: Wake up before it's too late

Discussing 'Sustainable Intensification' in the Bulletin a year ago I wrote that there is "no place for a multi-national corporate driven food system that does not recognise planetary boundaries or equity; that is based on appropriation of nature through patents and intellectual property rights; and refuses to put ecological processes above input sales – even if it has 'sustainable' on the wrapper."

Since then this approach to producing and distributing food and managing natural resources has become even more dominant.

In the last year we have seen the launch in the UK of an Agri-Tech strategy which is built on it; a Sustainable Intensification Research Platform which will further it; a 'New Alliance' for development in Africa which is characterised by it; and the completion of the CAP reform process which fails to address it.

In the face of this; is there any place left for organic farming and similar agroecological approaches to sustainable food production? And if there is, how can we claim that place?

These are the issues that are at the heart of January's ORC conference - Intensive Sustainability or Sustainable Intensification - which way forward for organic farming?

There is a major and frustrating disconnect between reports coming out of international agencies on the sustainability of the food system and food security and the policies of the UK and other governments.

Going back to the International Assessment of Agriculture, Science and Technology for Development (IAASTD) in 2008, numerous publications from organisations such as the FAO and UNCTAD have endorsed the need for fundamental changes in the food system and placed agro-ecological approaches at the centre of them.

A recent one published by UNCTAD – Wake Up Before It's Too Late – included in its key messages; "The world needs a paradigm shift in agricultural development: from a 'green revolution' to an 'ecological intensification' approach" which includes the development of agroecology, agroforestry and organic farming.

You will search in vain for these ideas in the UK Agri-Tech strategy and find only passing and rather dismissive references in papers on sustainable intensification.

The reason is that it is now the accepted wisdom that food production has to increase dramatically in order to feed a world population of 9 billion by 2050 and that the only way to do this is to somehow use intensive production methods sustainably through the existing markets and with an economy based on patents and other intellectual property rights.

The fact that we already produce enough calories globally to feed 14 billion people and that we waste about 40% of all the food we produce does not form the basis of government policy or strategy.

Nor does the fact that our society has a choice about what it eats. The western, meat based diet is not an absolute fact of life; it is a societal choice.

During the conference we will be discussing whether producing more food is really the priority, or are the climate change, environmental pollution, soil and water degradation and biodiversity loss problems now too great? Should our real focus be on intensifying the sustainability of our food systems, rather than intensifying production with questionable sustainability benefits?

And critically how we can move organic farming from the periphery to the centre of a genuinely sustainable global land management and food system.

There is no doubt that we need to improve our production techniques; influence market structures and economic perspectives; but we also need to create a political momentum that can only come from encouraging organic and other consumers to become active sustainable citizens.

We may not have all the resources to do that at the moment but we do have the vision to help to persuade people to 'wake up before it's too late'.

Lawrence Woodward

Highlighting 'trade-offs' in organic cereal production

Interesting results are emerging from this year's cereal trials at Wakelyns Agroforestry which are helping us to understand some of the 'trade-offs' - e.g. grain yield v straw yield, shelter v shade – that are part of organic farming. **Nick Fradgley, Henry Creissen, Tom Hughes and Martin Wolfe** summarise some of them.

Conventional plant breeders have long been selecting in favour of grain. However for organic breeders both straw and grain yield are considered to be important outputs because higher straw yield has been linked to increased weed competition, nutrient usage and cycling of organic matter. A target for organic breeding could therefore be to identify the potential for breeding varieties to provide higher straw yield whilst maintaining a high grain yield.

Gathering straw yield data is needed to increase understanding of the trade-off between vegetative growth and grain yield. This year we have been able to get an accurate measure of straw yield in different trials by adapting a baler to produce 'mini-bales' of straw from a single plot.



Straw v grain in oats and wheat

Initial results from oats (grown in the QUOATS project) this year suggest that selecting for both straw and grain yield may be possible, with varieties such as Mascani demonstrating high levels of both (Figure 1).

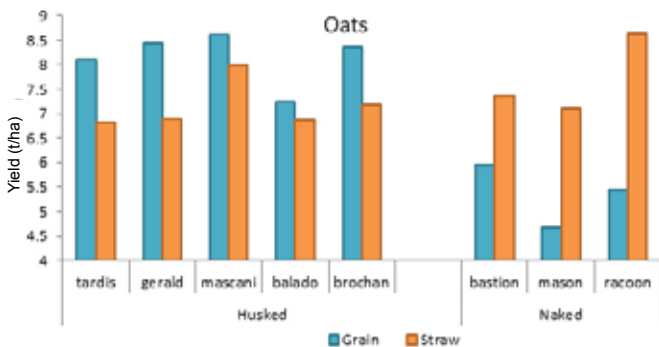


Figure 1: Mean grain and straw yields for five husked and three naked oat varieties, 2013 trials data.

Winter wheat trials in which new lines selected under organic conditions were compared to the high yielding pure line Alchemy also showed interesting results. Although Alchemy had the highest average grain yield it was not statistically greater than the four highest lines including Line 3, which did have significantly greater straw yield (Figure 2).

The weed 'trade-off'

A more in-depth analysis of this trial will investigate which components of vegetative growth, for example crop height or canopy cover at different times of the season, have the most significant impact on weed competition.

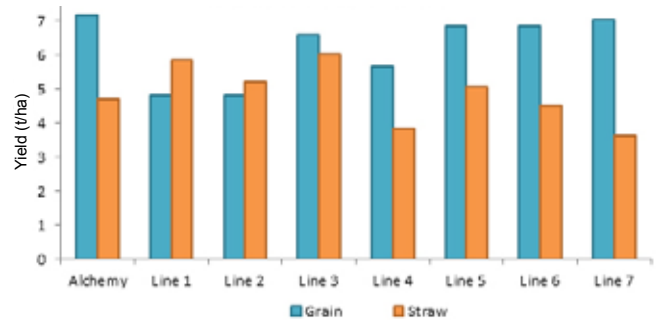


Figure 2: Mean straw and grain yields for the winter wheat variety Alchemy and seven lines selected from the composite cross population.

Competitive ability relating to the suppression of weeds must, however, be traded-off against intra-crop competition which can limit grain yields. Crop traits such as erect or planophile leaves (Figure 3) which affect the shade cast by the crop canopy can influence this.



Figure 3: Photos taken on 04/06/2013 showing lines with leaves that are a) erect or b) planophile

Shade or shelter

We also looked at shade from a different perspective with cereals grown within rows of hazel hedges (Figure 4). Observations of plot yield data across the hazel alleys indicate that the hazel hedges have a negative effect on cereal yields, but this appears to be limited to an edge strip of about 2-3m from the hedge itself. Overall, this means that the yield in an alley may be about 8% less than if the hedges were absent. However, the overall cereal yields were about 7 t/ha, considerably more than average organic cereal yields. What we don't know is how much of that gain is due to the rotational system at Wakelyns or to possible positive effects from the presence of the hazel hedges (shelter, higher temperature, nutrient cycling etc.). It could well be that there is a net positive effect of the hazels on cereal yields, despite those obvious edge effects. As ever more research is needed!

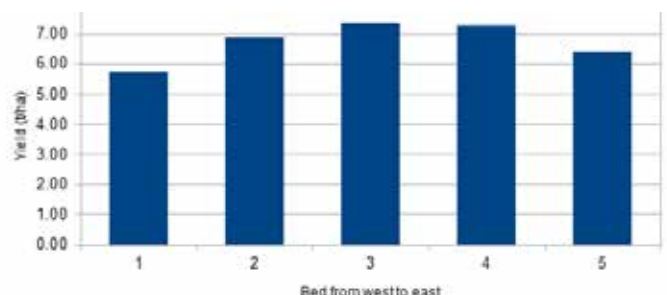


Figure 4: Mean plot yields in beds across the width of agroforestry cropping alleys



Staff changes at ORC

Konstantinos Zaralis

In January ORC's research team will be boosted by the arrival of Konstantinos Zaralis, also known as Kostas, who joins us as Senior Livestock Researcher. He comes with a wealth of experience and will be an asset to the team.



Kostas has a PhD from the School of Biological Sciences, University of Edinburgh and an MSc in Animal Production and Nutrition from the University of Aberdeen. His main research interests focus on mechanisms that underlie the regulation of food intake in farm animals, interactions between genotype and nutrition on animal productivity as well as nutritional and environmental factors that affect the ability of animals to cope with disease. As a post-doc researcher at the Scottish Agricultural College he worked with mathematical models to describe breed/genotypic differences of farm animals in production efficiency.

Over the last four years he carried out research at the Swedish University of Agricultural Sciences on the effects of maturity stage at harvest and dietary inclusion rate of whole-crop maize silage on feed intake, feeding behaviour and performance of finishing dairy bulls and ram lambs.

Kostas is involved in the OptGraze (Optimal Grazing Strategy for Dairy Cows) project in collaboration with Bioforsk in Norway and will continue this work from ORC. From January 2014 he will be responsible for ORC's involvement in the EU SOLID project (Sustainable Organic and Low Input Dairying). He is member of the Nutrition Society (NS), the British Society of Animal Science (BSAS) and the Nordic Association of Agricultural Scientists (NJF).

Robbie Girling

Robbie Girling joined us from the University of Southampton in June to take up his role as ORC's new Principal Researcher and team leader in Crops and Agroforestry.



Robbie's academic background is in the field of insect behavioural ecology and olfactory communication. His research experience has centred around the concepts of pest management and the wider biological control of insect pests in agricultural, horticultural and forestry systems. He has a PhD in chemical ecology/plant-insect interactions from the University of East Anglia and seven years post-doctoral experience, having worked in laboratories in California, Ireland and the UK. Robbie's role at ORC is as a member of the Senior Management Team, overseeing all of the projects of the Crops and Agroforestry Team on areas such as plant breeding, crop production, eco-agroforestry and biodiversity.

Robbie is the overall coordinator of COBRA our 42 partner CORE Organic funded project to coordinate organic plant breeding across Europe. He also leads a dissemination task for another EU project, OSCAR, which will produce a toolkit to optimise the use of cover crops and living mulches in

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rotations. In addition to his work at ORC Robbie continues to supervise his two PhD students at the University of Southampton. His students are working on the effects of diesel exhaust pollution on honey bees, and on the population ecology of the Oak Processionary moth, an invasive pest in the Royal Parks of London whose hairs can result in serious allergic reactions. Robbie is not the first member of his family to spend time at ORC; five years ago his partner Laura Clements was the first member of ORC's successful internship programme.

Henry Creissen

Henry Creissen joined ORC in October this year as a researcher in the Crops and Agroforestry team based at Wakelyns Agroforestry.



Henry has recently completed a PhD at the John Innes Centre on 'The role of genotypic diversity in stabilising plant productivity in variable environments'. His project involved using winter wheat and winter barley field trials to test the ability of variety mixtures to control disease and stabilise yields. He also conducted research on the suitability of *Arabidopsis thaliana*, a plant regularly used in research laboratories due to its rapid lifecycle and small size, as a model with which to investigate crop variety mixtures. His research interests are focused on the use of agro-ecosystem approaches to modernise arable farming through the application of ecological principles in an agricultural setting. Since arriving at ORC Henry has taken on the role of deputy-coordinator of the Core Organic II project COBRA. On his first day with ORC Henry flew to Germany for the COBRA executive board meeting, so he was in at the deep end! His other main area of work is on the OSCAR project.

Outside of his ORC work Henry is involved with a UK charity based in Sierra Leone which aims to improve profits from farming to support local schools.

Pastures new

Katharine Leach left ORC in the middle of September to take up a new position with Quality Milk Management Services Ltd (QMMS) in Somerset. Katharine had worked with ORC as a Senior Livestock Researcher since May 2011. As part of the SOLID (Sustainable Organic and Low Input Dairying) project Katharine was responsible for developing on-farm research projects on dairy farms in the UK, such as monitoring the mob-grazing with diverse swards on Manor Farm with Rob Richmond and overseeing similar activities in other countries. Katharine said: "I have really enjoyed all the international contacts I have made and opportunities I have had through SOLID and hope to keep in touch. I have learned a lot through the project and very much appreciate the support I have had from all SOLID colleagues". We thank her very much for all the hard work during her time here. We hope to stay in touch and wish her well in her new position.



Practices requiring low initial investments are the key to cost effective greenhouse gas reduction on farms

Laurence Smith and Catherine Gerrard report on the main findings of a recent project which investigated the financial benefits available to farmers adopting low carbon practices.

The research was commissioned by the Soil Association's Low Carbon Farming project and led by the socio-economic research team at the Organic Research Centre. The project aimed to assess the economic costs and benefits of on-farm greenhouse gas mitigation measures and looked within four areas of low carbon farming (nutrient management, soil and grassland management, livestock management and renewable energy). These were investigated through a literature review, telephone interviews with farmers and analysis of Farm Business Survey data.

The most cost effective measures for reducing greenhouse gas emissions are those requiring a low initial investment from the farmer, such as the use of clover and other legumes in place of manufactured fertiliser, the adoption of cover crops and the use of nutrient budgeting software. However the economic impact will depend on a range of factors such as the farm type, crop-rotation, location, soil type and production intensity. For example, under current economic conditions the use of short-term clover leys on conventional stockless arable farms is unlikely to be economically viable.

Other measures that require a high investment can be cost effective if methods for reducing initial costs can be found (e.g. obtaining grants or using contractors for improved slurry application instead of buying new equipment).

The research also found that promoting on-farm efficiency will encourage a more cost effective enterprise, particularly with regard to feeding of stock, management of livestock health and improved breeding. Although actions in these areas may require investment, both in time and money, payback periods are likely to be relatively short.

Farm Business Survey data analysis, using all farms sampled in 2011/12, revealed that across many farm types higher fertiliser cost implies higher profitability. However this is not the same for higher concentrate costs (used as a proxy for use). Here the results are in general not significant and in some cases (lowland grazing livestock farms) high concentrate cost (perhaps implying high use) may have a negative impact on profitability.

Renewable energy generation

Both the review of literature and farmer conference calls revealed some concerns over the economics of on-farm wind turbines. Larger wind-farms may be more viable but represent a substantial change to the standard agricultural business model.

Solar PV may have more potential due to lower investment and maintenance costs and farmers reported generally positive experiences from the perspective of cost and returns.

With regard to on-farm anaerobic digestion (AD), the high investment and running costs, in addition to the need for specialist knowledge, were raised as concerns during the telephone discussions. However, the economic returns from

AD can be attractive if the costs can be met and a source of suitable, high-energy feedstock can be secured.

A cross-cutting theme was that farmers require more information on many of the measures described above, for example some were unaware of the existence of nutrient budgeting software or sources of further information on renewable energy generation.

Hopefully this can be addressed through future work led by the South-West Agricultural Resource Management (SWARM) hub and farmer-focused events as part of the Soil Association and ORC's work in this area.

Visit the Low Carbon Farming Project pages at www.soilassociation.org/lowcarbon for technical advice on how to cut on farm emissions and save money.

The Duchy College-led SWARM hub also contains a wealth of information on many greenhouse gas mitigation and renewable energy options. Visit: www.swarmhub.co.uk for details.

Richard Jacobs (1963-2013) Showing people where the glow-worms are

Richard Jacobs (Jake) died on Sunday 1st December 2013. Lawrence Woodward reflects on Jake's life and contribution to the organic world.



Even writing his obituary, I find it hard to think of him as other than Jake.

Not that there is anything wrong with 'Richard'. It's just that when he first introduced himself to me he said "call me Jake" and it seemed to fit so well it became indelibly planted in my mind: and in many other people's because Jake is what he was almost universally known as.

I once said to someone that Richard was his Sunday name; he looked at me in a mock-stern way, said it certainly wasn't a Sunday name and came out with one of his curious



Yiddish phrases – no doubt including ‘schlep’ or ‘schlepper’ – which I never understood, always thought was funny but was never entirely sure it was meant to be.

Jake liked to present himself as a simple and straightforward person and he did this well. But it hid a degree of complexity that carried us through more than a few late night/early morning “discussions”. I am sure it also gave him the insights needed to chart the tricky waters between principle and pragmatism which he was so very skilled at doing as Chief Executive of Organic Farmers and Growers Ltd (OF&G).

Being a principled pragmatist was Jake’s hallmark and it enabled him to make an effective and major contribution to the organic sector through his work at OF&G; his role on various government committees such as ACOS (The Advisory Committee on Organic Standards) and the UK Organic Certifiers Council; and his contributions to developing and presenting organic sector policies. It also made him an excellent ambassador and advocate for organic farming to the conventional farming community and the media.

Jake began working for OF&G in 2000, shortly after leaving ORC, and became its Chief Executive in 2004. During this time it became clear that he had probably been made for guiding people along the sometimes tricky road set by the principles and practice of organic farming.

Before that he worked as Farm Manager at Elm Farm. Hardy Vogtmann and I first met him during a visit to the CWS’s organic farm. We were impressed and recruited him for the then vacant position. He grew in both knowledge and confidence during his time with us to the point where he needed new challenges.

It was always satisfying in later years to see his principled pragmatism – which I like to think he developed at ORC – being used so effectively.

But my abiding memory of Jake is of those summer nights when he took great delight in taking people around Elm Farm to show them where the glow-worms were. People who had never before seen glow-worms and possibly had never walked the fields on a moonlit summer’s night were entranced.

It’s not too fanciful to think that as an advocate for organic farming he was doing the same thing for the rest of his life.

A further tribute to Jake can be found on the OF&G website: <http://www.organicfarmers.org.uk/news-events/richard-jacobs/>
See also our Flickr page for more photographs from his time at Elm Farm - www.flickr.com/photos/organicresearchcentre/.

Photos of Jake while at Elm Farm. Jake was closely involved in the work on covered composting of farmyard manure.



Getting good ideas and avoiding mistakes

Phil Sumption reviews three new books that will be useful to the new and aspiring organic grower

Books on organic market gardening are like the proverbial London buses, you wait for years and then three turn up at once. There was a gap between the books written by the Lawrence Hills’ generation and Eliot Coleman putting pen to paper. His books, including the seminal ‘The New Organic Grower’, were a revelation for many growers. Then in 2006 two arrived at once, Organic Vegetable Production – a Complete Guide, from the research team at HDRA and Growing Green by Jenny Hall and Iain Tolhurst.

And now, three books have arrived in quick succession. First up is **The Organic Market Garden Start-up Manual** which is a collaborative effort with authors from the UK, the Netherlands, Spain, Hungary and France. It is a 200 plus page tome, providing a useful, if at times eclectic, introduction to organic market gardening.

The book is more a handbook for starting up a market garden rather than about organic production techniques. There are chapters on technical aspects (how to obtain land, what sort of tools you should get; protected cropping and water use; and management issues (marketing, enterprise management, organic certification, human resources, support services and multifunctional farming). Chapters were written by each participating organisation and it suffers a bit from an inconsistency of backgrounds and approaches - with the chapter on rotation challenging convention, but that’s not necessarily a bad thing! There is also quite a strong leaning towards biodynamic production. It is a well-structured manual which draws on many examples and case studies from across Europe.

Gardening for Profit – From home plot to market garden is a compact paperback book written by Kate Collyns who graduated from the Soil Association Apprenticeship Scheme to start her own market garden business near Bath. Kate sets out her experiences and answers all the questions she had to answer herself when setting up in business.

Aimed at the small and part-time grower it covers the transition zone between enthusiastic amateur and commercial grower. Kate’s book is the only one of the three written from a solely UK perspective and includes some basic costings from her own business. She expertly demystifies some of the less glamorous aspects of running a market garden; sourcing funding and the financial and legal paperwork.

Market Farming Success – The Business of Growing and Selling Local Food by Lynn Byczynski is an updated and expanded version of a 2006 classic. This is an American publication but there is plenty of material relevant to the UK grower; including good advice on setting up for farmers’ markets, diversifying farm enterprises and business promotion. There is much to learn from and to inspire in this book for the small-scale grower.

The Organic Market Garden Start-up Manual . £17.50 incl P+P. Contact Arjen Huese to order your copy: info@aethersolaris.nl
Gardening for Profit is published by Green Books. £9.99
Market Farming Success is published by Chelsea Green. £21.99



Is the government's new Agricultural Technologies Strategy valid and credible or a repackaged fantasy?

In July the government launched its much-heralded and delayed Agricultural Technologies Strategy¹. £160m is to be made available for the development and dissemination of new agricultural technologies. Dr. Bruce Pearce, Lawrence Woodward and Laurence Smith consider its aims and credibility.

The Agricultural Technologies Strategy (ATS) comes with high expectations with the Departments for Business, Innovation and Skills (BIS), Environment, Food and Rural Affairs (Defra) and International Development (DFID) proclaiming:

'The UK will become a world leader in agricultural science and technology following the launch of a new strategy to deliver sustainable, healthy and affordable food for future generations.'

Another view is that a lot of taxpayer money is being devoted to something big on hype but lacking credible evidence that it can succeed². The launch and the document itself highlights a focus on inputs and high-tech products; profits from 'intellectual property'; money for collaboration with GM and agrochemical companies; start-ups for venture capital companies; and the need to reduce precautionary regulations. Agro-ecology may feed people and protect biodiversity but it doesn't readily tick any of these boxes and it's not easy to see how it fits in.

'Feeding the world through business and science'

Recently David Cameron has taken to standing in front of banners extolling the virtues of feeding the world 'through business and science'.

He never mentions ecology, small and family farm empowerment, access to land and water, curbing food commodity speculation, cutting waste or ensuring equity in the food chain – all of which are critical to 'feeding the world'. Neither does this strategy, even though it contains the now common and ritualistic statements about the need to increase food production to feed the world's growing population. Nor does it mention the science and successful practical implementation around the world of agro-ecology, which is not based on restrictive intellectual property rights but is open and accessible to all, and is recognised by UN agencies as the best approach to providing food security in the Global South. And that is because the ATS is first, foremost and completely about high tech business opportunities and economic growth in the UK and not about feeding people; and it's not about protecting biodiversity and the environment; nor about family farms, rural communities or an equitable supply chain.

According to Science Minister David Willets:

"To get ahead in the global race, this strategy sets out how we can ensure that we turn our world-beating agricultural science and research into world-beating products and services.

"This Agricultural Technologies Strategy follows the recent plans for automotive, construction, aerospace and other key sectors to secure sustainable future growth in the economy."

New strategies or repackaged fantasies?

Key points in the strategy include:

- An Agri-Tech Catalyst aimed at converting science research projects into commercially viable companies.
- A series of Centres for Agricultural Innovation where farm technologies can be tested and demonstrated.
- A Centre for Agricultural Informatics and Metrics of Sustainability which will gather data to identify and track methods of food production.
- A 'multi million pound' scientific research partnership between publicly funded Rothamsted Research and the GM and agri-business giant Syngenta.
- Money from Dfid to develop largely genetically engineered 'biofortification' of crops.
- The creation of an industry Leadership Council to unify the agriculture technology sector and make the UK more internationally competitive.
- The recruitment of a new UK Trade and Industry agri-tech team to boost exports and overseas investment in the UK's agricultural technologies
- £30 million for four agri-science research and innovation campuses by the Biotechnology and Biological Sciences Research Council.

The government hopes that the ATS will entice industry to invest heavily in the sector and UK farming will consequently be transformed by using high-tech approaches to increase productivity whilst reducing environmental impact and resource use.

The claim is that by increasing exports of farming and food system related technology and know-how, the UK can benefit from the market opportunities of the changing worldwide demand for food and also become a world leader in addressing global food security issues.

Defra Minister for Science Lord De Mauley said: "We are investing in technologies that will enable British farmers to meet these challenges and take advantage of the growing demand in export markets for British food." Whilst there are new elements in the ATS a number of these proposals are a repackaging of existing policies which, using taxpayer money, have been tried and have failed in one form or another before.

No evidence of a viable business case

The government's 'Life Science Advisor', MP George Freeman, is a member of the strategy's Leadership Council.

He claims that: "by better commercialising our science base we can help UK improve its productivity, spawn a new generation of start-ups, and attract major new research investment and export markets."



In fact there is little evidence that this is the case and the strategy document does not present any credible explanation as to how it sees this happening. Venture capital and start-up companies have been consistently unsuccessful in agriculture generally and the seed, plant and livestock breeding fields are dominated by a few corporate giants who Hoover up the few small enterprises which look as if they may be successful. Nor is it clear that corporate investment in the strategy will be forthcoming in large amounts. Collaborative projects where companies profit from accessing taxpayer funding, publicly funded research facilities and knowledge often happen but evidence of the reverse is hard to find.

There is a real possibility that under this ATS, public funds will be used for research which industry should be doing or would have been doing anyway.

In a time of austerity we shouldn't be churlish about government putting money into the agriculture and food sector but we are concerned that this strategy is overly focused on what can be marketed (either as a product or patentable intellectual property) and gives little attention to the public goods that farming can and does deliver.

We are concerned that it will:

- a) drive further intensification by encouraging specialised, industrial approaches to farming and ignore the needs of farms and farmers that do not fit this model;
- b) fail to recognise and build on the innovation that takes place on organic and other agro-ecological farms;
- c) help to marginalise the science and technology of agro-ecology when UN agencies and development bodies are increasingly seeing it as critical to 'feeding the world', and to delivering a wide range of non-marketable public goods relating to soil and water protection, climate change mitigation and biodiversity benefits.

Can organic farming benefit in any way from the ATS?

We believe that agro-ecological, farm systems approaches are scientifically and technologically innovative even though they do not produce a marketable 'silver bullet' product. There is no reason why technologies appropriate to these systems (such as nutrient budgeting software, soil evaluation systems and farm based population breeding approaches) should not be part of the ATS. However, there is little to demonstrate that the members of the strategy's Leadership Council – however capable they may be in their own spheres – have any appreciation of agro-ecology or the needs of farmers following this approach. Nonetheless we will continue to work with partners within the organic sector to try to ensure that the ATS does not completely ignore the innovation performance and potential of the sector. For example:

- We are engaged with the development of ideas that might feed in to the Centres of Innovation and are in discussions with a number of partners who are interested in working to be part of a Centre for Agricultural Innovation.
- The Centre for Agricultural Informatics and Metrics of Sustainability aims to 'establish the UK as a world class centre in agricultural informatics' Discussions with

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industry and stakeholders have started on how this might evolve but it could include the development of virtual information-hubs and monitor farm networks which would be beneficial to organic farms. We are working with partners to provide input where we can in this area.

- We are engaging with others to bid into the ATS catalyst funds to develop systems and technologies fitting for agro-ecological approaches to production.

We will remain watchful and open to opportunities of using the ATS to benefit organic and agro-ecological systems. However it is clear that its aim is to develop science as an intellectual property based business opportunity and one that is especially export focused. We are concerned that this is likely to give rise to developments – like GM – which are distrusted by the public and thereby do a disservice to farming. It is hard to see how the ATS will help 'feed the world' and it's not even clear it will bring much benefit to the UK economy.

References

1. <https://www.gov.uk/government/publications/uk-agricultural-technologies-strategy>
2. <http://www.gmeducation.org/latest-news/p213481-millions-to-promote-gm-and-weaken-food-and-environment-safety.html>

Sustainable Intensification Research Platform

Aligned with the Agricultural Technologies Strategy Defra in September launched a call for tenders within its Sustainable Intensification Research Platform (SIRP). The SIRP takes forward a recommendation of the Green Food Project to develop a programme that brings together researchers working on the productive, environmental, social and economic aspects of farming through coordinated research activities¹.

The aim is to establish multi-disciplinary translational research to develop tools and evidence to help farmers, policy makers and other decision makers improve the productivity and environmental performance of UK agriculture. The SIRP is split into 3 projects with total funds of around £4-5M. Projects are expected to start in January 2014 and be completed by the end of 2017. They are:

1. Integrated farm management for improved economic, environmental and social performance
2. Opportunities and risks for farming and the environment at landscape scales
3. A scoping study on the influence of external drivers and actors on the sustainability and productivity of English and Welsh farming.

ORC is currently working with others in a large consortium to submit a tender to this call. The development of the Public Goods Tool will form an integral part of the bid. This will help ORC to improve the assessment process and collect better data on farm performance in key areas, such as farm-gate nutrient budgets and business resilience.

However, this is a drop in the ocean of what is needed to improve farming systems in the UK. Moreover little if any project money will be spent on farming research *per se* and none on production problems.

1. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69575/pb13794-greenfoodproject-report.pdf



CAP implementation – full steam ahead! (but what about organic?)

With multiple consultations in progress around the UK, you'd be forgiven for thinking there is no end to it all – when are decisions finally going to be made? But key decisions are being made now, and most of the rest will have been by the time the next Bulletin appears. Nic Lampkin reports.

In the process, some highly significant issues have emerged that have yet to be fully resolved. In some cases, different parts of the UK take quite different positions, not all consistent with the broader EU context.

Recognising the environmental contribution

This may be taken for granted by most organic producers and consumers, but many officials remain sceptical despite the published evidence and clear statements in support from the European Commission, Court of Auditors and many other European governments. ORC has collated a review of the environmental evidence which has been submitted to all the UK governments, but the debate continues to the extent even that Northern Ireland has proposed not to offer any financial support to organic producers under the next Rural Development Programme (RDP). In contrast, the Welsh Government is clear that they will support organic farming as an environmental scheme, but recognises the need for the environmental evidence to be better communicated.

Calculating organic maintenance payments

The European agri-environmental and rural development regulations have, since 1994, provided for both conversion and maintenance support for organic producers, recognising that the environmental gains would be lost if producers reverted to conventional production, and that premium prices, while important, might not fully cover the added costs of organic production.

The UK view, particularly in England, has been somewhat different: conversion to organic farming should be a business decision, and the environmental benefits do not justify using public funds to support businesses which are otherwise less profitable. Defra has never been keen on maintenance payments. The original Organic Aid Scheme had no maintenance component, and the management element of Organic Entry Level Scheme (OELS) funding was only to cover the costs of certification and some additional management time. It is therefore not surprising that support payments here are among the lowest in Europe. The issue of comparing organic profitability with that of similar conventional farms and basing payments on the income foregone/costs incurred between the two, as envisaged by the EU, was, and still is, deemed unacceptable. This issue is being intensely debated in submissions by ORC and others.

Double-funding deductions

The decision by the EU that organic farms should automatically qualify for Pillar 1 Greening at first seemed to be a major recognition of what organic farmers delivered. But the June agreement made it very clear that there should be no double-funding between Greening and other organic support and a new threat emerged. In the last few weeks, the Commission circulated proposals to member states suggesting that all producers receiving organic support payments should be subjected to a double-funding deduction of 33% of the Greening value. Later this was reduced to 20%. The IFOAM EU Group, with advisory support from ORC, met with the Commission to argue for a different approach, that costings

for organic schemes should be based on the assumption of a Greening compliant starting point, as this would address the legal requirement to avoid double-funding without the need for deductions which would be seen as penalties by many. Our understanding is that the Commission has accepted this position and is developing further proposals based on it.

Small farms

The EU support regulations provide for specific support for small farms (typically receiving around €1,000 in direct payments) with a minimum eligible area for schemes of 1ha. In the UK, Defra has decided that there should be no small farm scheme, and that the minimum area should be 5ha. Wales has proposed no small farm scheme and a minimum area of 3ha but may increase this to 5ha. These decisions/proposals, while recognising that some small holdings are not agricultural, are a real blow to small-scale commercial horticultural producers. Based on Defra figures, some 6,000 commercial holdings in England will be affected. ORC, Organic Centre Wales (OCW) and the Organic Growers Alliance (OGA) have responded to the consultations raising their concerns about the impacts.

Targeting and selection criteria

We're also needing to work hard to ensure that selection criteria, which may be needed if there are insufficient resources for all applicants, are defined in a way which doesn't result in organic producers in areas of low environmental importance finding themselves without support resulting to unintended damage to organic markets.

Agroforestry

While the European Commission, European Parliament and many other EU member states have seen the potential environmental and productivity benefits of agroforestry, UK governments are not yet fully convinced. For the first time, agroforestry was being given serious consideration as an option in England and Wales. While the Welsh proposals are developing further, the establishment of an agroforestry option developed by Natural England based on research commissioned by them from ORC has been blocked by Defra, who question the benefits, likely uptake and limited stakeholder support. We believe that this represents a serious underestimate of agroforestry's potential, and the potential for uptake if given real encouragement, and we are continuing to work for the retention of an option in the RDP.

Making the most of the RDP

It is also important that organic support schemes are not developed in isolation from other support for training, advice, capital investment, market development etc. The EU encourages member states to think strategically about how their organic farming support can be underpinned by these other measures, possibly in an action plan framework. While Scotland and the Republic of Ireland both have action plans in place, England, Wales and N Ireland don't. There is very little sign of such strategic thinking in the RDP consultations published so far, but perhaps something to work for?



Welsh Government organic consultation

Wales is so far the only country in the UK to have issued a specific consultation on its organic farming support, based on advice commissioned from Organic Centre Wales led by ORC. Meetings with producers were held across Wales in mid November and at the Winter Fair in December to debate the Welsh Government's proposals to:

- continue supporting organic farming under its 2014-2020 Rural Development Plan as an environmental measure, with support given to both converting and established organic farmers;
- operate the organic scheme as a 'stand-alone' within the Glastir 'family' of schemes, with combinations with other Glastir options permissible but voluntary – organic participants would qualify for other elements currently restricted to Glastir Entry agreement holders if these restrictions remain under the next RDP;
- rebalance the conversion and maintenance support payments, by reducing conversion payments while still recognising the added cost of conversion, and increasing maintenance payments to better reflect actual costs of organic management;
- offer differential payment rates based around land or crop codes and to continue using lower rates for more extensive grassland and moorland systems;
- include a contribution to certification costs as part of the area payment, but with an area based cap introduced to avoid overcompensation;
- with respect to Greening, if implementation regulations allow, make no dual funding deduction from Pillar 2 organic support where producers have qualified, or can qualify for Greening by other means, in particular the 75% permanent grassland condition;
- maintain the minimum area eligible (currently 3ha) in line with both Pillar 1 and other Pillar 2 schemes;
- increase the current maximum area eligible for payment from 300 to 700 ha;
- undertake a feasibility study of the potential to introduce an organic co-operative scheme (e.g. targeting small-scale growers or catchment/landscape outputs) during the next RDP;
- develop environmental, and potentially also economic sustainability, selection criteria to prioritise support and select participants where the budget is limited;
- require applicants for conversion/maintenance support to have a comprehensive business and farm management plan and have accessed advice to do this where relevant;
- develop a new investment support scheme based on loans and/or capital grants also open to organic producers.

The consultation closes on 21st January 2014. Find out more at: <http://wales.gov.uk/consultations>. For producers in Wales who would like to submit a group response, your local Farming Connect facilitator may be able to assist the process.

Organic Entry Level Scheme (OELS) OCW will be continuing to advise the Welsh Government on the further development of the scheme once the results are known.

Welsh CAP consultation - an extended conversation

The Welsh launched the first of the UK CAP implementation consultations back in July at the Royal Welsh Show, just after the EU level political agreement was reached and before many of the fine details were finalised. The consultation closed on November 30th and announcements on final decisions are expected in January. A response was submitted by Organic Centre Wales and can be found at: www.organiccentrewales.org.uk.

Meanwhile, plans are in place for two further consultations, on Glastir and the RDP in January. This will probably be to a much shorter time scale as the aim is to submit the RDP to the European Commission early in the Spring so that agreements can be reached and schemes opened to applications in the Autumn.

The Organic Group of Wales, led by producer Charles Weston, is co-ordinating responses from the Welsh organic sector to the various policy developments.

Defra consultation – a snap election

Defra's all encompassing, single consultation due in October was delayed due to the Ministerial reshuffle and launched early November with a closing date of 28th November.

Some issues, particularly relating to small producers, had already been determined by Ministers and were not open for further comment, but ORC did raise the potential impact on growers, as well as other issues covered in this article, in its response, which can be found on the CAP reform tab under Policy & Debates at www.organicresearchcentre.com.

The English Organic Forum, co-ordinated by ORC, is engaging with Defra on many of the issues arising.

Scottish consultations – just getting started

The Scottish Government's CAP implementation consultation had not been launched at the time of writing, but is expected in December with responses by January. As a consequence, the issue of the transfer of resources from Pillar 1 to Pillar 2 has been picked up as a separate 'mini-consultation' which closed on 16th December. A separate RDP consultation document is expected shortly after. For further details on the planned consultations, see: www.scotland.gov.uk/Consultations/Forthcoming

The Scottish Organic Forum (www.scottishorganicforum.co.uk), the industry-led body underpinning the Scottish Organic Action Plan 2013-2015 (www.scotland.gov.uk/publications/2011/03/14093552), is actively engaged with the Scottish debates – contact Deborah Roberts (SOPA), Laura Stewart (SA Scotland) or Richard Huxtable (SRUC).

N Ireland consultation – no support for organic?

The NI CAP (direct payment) consultation is currently open for responses, with a closing date of 17th January 2014. See: www.dardni.gov.uk/index/consultations. The RDP consultation, held earlier in NI than elsewhere, closed on 21st October and caused consternation in the organic sector with its proposals to cease all support for organic farming. Strong responses were made by a new industry group, Organic NI, and environmental groups - decisions are awaited.



Farmers at the centre of innovative blight resistant potato breeding

*The Bioimpuls programme was established by the Louis Bolk Institute with Dutch government funding in 2009, in response to the lack of potato varieties resistant to *Phytophthora* (commonly known as potato late blight). It uses classic breeding methods, crossing wild potato species with modern cultivars and is making good progress. From a UK perspective the collaboration between researchers, farmer-breeders and commercial breeders looks highly innovative. The **Bioimpuls** project team report on their progress.*

Farmer-breeders play an important role in potato breeding in the Netherlands. From the first seedling selection to a fully developed variety takes about eight to ten years. Farmer-breeders carry out the bulk of this work in the first three years, screening large amounts of seeds to select a handful of promising clones.

Their work saves commercial breeding companies much time and money, because it is on a 'no cure, no pay' basis. This means that they only receive shared royalties if the clones they have selected become registered, marketed varieties. This system has been a key to the success of potato breeding in the Netherlands.

Before the Bioimpuls programme was launched, there were only two organic farmer-breeders in the Netherlands. To increase the odds of finding new varieties suitable for organic production, it was crucial to involve more organic farmer-breeders and to carry out selection work under a wider range of organic growing conditions.

A potato breeding course was therefore set up to provide background information and insights into breeding and selection methods. As a result there are now thirteen organic farmer-breeders participating in the programme providing field sites on a range of soil types, and enabling testing for susceptibility to specific diseases, such as common scab.

The participation of commercial breeding companies in Bioimpuls has benefited all parties. The companies have increased their awareness of the need for organic potato varieties, and this offers new perspectives for sustainable and organic potato production. They are generally glad to collaborate with organic farmer-breeders, as it enables them to field-test their breeding material under 'real-life' organic growing conditions.

Some companies consider the organic sector to be an important and growing market for their future range of products. Others are eyeing new export possibilities, as new robust varieties would do well in low-input countries.

Bioimpuls potato breeding course and manual

The Bioimpuls potato breeding course is taught by Jan van Loon, a retired but still active farmer-breeder, who has several varieties to his name. From 2013 it will be run under the auspices of three breeder associations and the Louis Bolk Institute. The material written for the course has been edited into a Potato Breeding Manual, published in September 2013 in Dutch and English. For more information about the course or to sign up, visit www.louisbolk.nl/bioimpuls; the manual is available via www.louisbolk.org/potatobreeding, priced at €53 (excluding shipping and handling). Contact e.lammerts@louisbolk.nl for more information.

New resistance from wild species

The organic sector not only needs resistance to *Phytophthora*, but also to diseases such as *Alternaria*, *Rhizoctonia*, common scab and the potato Y virus. A careful choice of breeding parents with low susceptibility to these diseases will increase the odds of robust progeny.

Other desired traits include efficient nitrogen use; sufficient dormancy (to exclude the need for chemical germination inhibitors during storage); and early tuber filling and maturation to limit the exposure of resistant varieties to *Phytophthora* spores and reduce the risk of resistance breakdown.

Whilst classical breeding from wild species is a long process, it has the advantage of allowing selection for multiple traits and is very appropriate for organic systems. The Bioimpuls programme used wild species collected several decades ago in Central and South America by Wageningen University. Modern varieties that show some resistance to *Phytophthora*, such as Sarpo Mira, are also used as parent lines.

Crossing wild species with cultivated potatoes is a time-consuming process. It takes three to four back-cross generations – each taking four to five years, so 12 to 20 years in total – to create new parent lines suitable for commercial breeding programmes. The process includes repeated crossings with a modern potato variety to adapt the plant material to our long day length.

Many selection rounds are then needed to optimise disease resistance and eliminate wild traits such as long runners, irregular tubers and high glycoalkaloid content.

Fighting *Phytophthora*

Phytophthora is known for its ability to mutate quickly and overcome resistance during heavy outbreaks. Therefore it is essential to raise as many resistance barriers as possible. As *Phytophthora* has several host-specific pathotypes, it is crucial to have a diversity of resistance genes present in the field, preferably within one variety.

The programme has therefore made various combinations by crossing parents with multiple resistance genes (from the highest quality resistance sources) and selecting the progeny that have inherited the resistance genes of both parents. These plants are kept for further selection.

The search for new robust varieties is an elimination race, because the potato has to meet numerous requirements. The first batch of clones in the programme was whittled down from 11,362 seeds originally sown in 2009. Out of this, in the winter of 2011/2012, the first group of 10 third-year clones was handed over to commercial breeding companies. The companies and their marketing



Selecting from the second-year clones at Bioimpuls' central fieldsite in Klaggenburg

departments will be testing these clones for various traits, at various locations.

It is hoped that the programme will produce enough promising material each year so that this can become an annual event.

The National Heroes of Taste

Unfortunately, varieties that work well for growers are not necessarily liked by consumers. A new variety will only capture the market if the potatoes taste and look good (e.g. have a smooth skin).

While there will always be personal preferences (such as for mealy or waxy potatoes), flavour characteristics such as 'too sour', 'too sweet' or 'too muddy' are readily recognised. A good-tasting variety is usually a stroke of luck, because flavour is not an explicit selection trait.

In 2012 Bioimpuls organised an elaborate tasting test of the most promising third-year clones and commercial varieties such as Biogold and Ditta. The work must have been a success, as three Bioimpuls researchers and growers were pronounced 'National Heroes of Taste 2012' after entering their new organic varieties at the 2012 Netherlands Week of Taste festival.

The next step: tuber resistance?

So far, the Bioimpuls breeding programme has mainly focused on resistance to *Phytophthora* in foliage. However, it has become clear that resistance is not always equally effective in the tubers. In the coming years the Bioimpuls programme will therefore test for both foliage and tuber resistance.

A version of this article originally appeared in the Organic Grower and was created from a leaflet produced by the Louis Bolk Institute. Many thanks to them for their cooperation. More info at www.louisbolk.nl/bioimpuls

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Replacing copper in EU organic farming systems

The development and use of new, blight resistant organic potato varieties can make an important contribution to achieving the EU policy of copper-free organic production systems. However, one important bottleneck for organic seed potato production is that, outside the Netherlands, organic certification does not require the use of organic seed material.

Within the Bioimpuls programme and as part of an EU project CO-FREE the Louis Bolk Institute has been working to improve the quality of organic ware potatoes and to explore marketing strategies for new blight resistant potato varieties. Clearly, all efforts to breed new varieties for sustainable production are wasted if the market does not respond.

The CO-FREE project is a collaborative EU project, involving eleven countries, aiming to develop innovative methods, tools and concepts for the replacement of copper in European organic and low input fruit, grapevine, potato, and tomato production systems.

ORC is also a project partner. We are evaluating an agroforestry approach to apple production as a means of reducing copper use in organic fruit systems. See www.co-free.eu

Sarpo potatoes

The Sárvári Research Trust is a not-for-profit company based near Bangor in North Wales, U.K. They trial and select Sárpo potatoes, resistant to late-blight disease, from material developed by the Sárvári family in Hungary. They also research the late-blight pathogen, *Phytophthora infestans*, and how it manages to evade most methods of control.

Six of their varieties are Nationally Listed in the U.K. Sárpo Mira and Axona are red, maincrop potato cultivars, ideal for low-input and organic growing, having the highest natural resistance to the new strains of blight as well as high resistance to common viruses.

More recent varieties include; Sárpo Una, a rose-pink second early suitable for boiling, salad and as an early baker, with good foliage-blight resistance for an early variety and excellent tuber blight resistance; white-skinned, early-maincrop Sárpo Shona is blight resistant and virus Yo resistant; Kifli is a white-skinned maincrop salad variety with outstanding flavour and Blue Danube is an early maincrop with spectacular blue-skinned tubers. All the Sarpo varieties smother weeds efficiently and have unusually long natural dormancy, preventing sprouting in store.

A new company, Sarpo Potatoes Ltd, to be wholly owned by the Trust, will commercialise their varieties and make them readily available. The company needs start-up funding and, following success with Buzzbnk crowdfunding last year, they are using this method of online funding again.

The present appeal is for small donations and larger loans with interest. Attractive rewards are offered to the crowd. www.buzzbnk.org/SarpoPotatoes

Eco-energetic communities in practice

ORC is participating in an EU funded project (TWECOM) investigating the economic feasibility of using woody biomass from farm and landscape features such as hedgerows in local, sustainable energy production. This will involve establishing a pilot project at Elm Farm. Germany already has some 70 such projects. ORC intern **Mary Crossland** reports on a visit she and researchers **Jo Smith**, **Sally Westaway** and three Hamstead Marshall residents made to a couple of them while attending a project partners meeting.

Scepticism about mainstream energy sources has led to growth in the number of German towns generating their own heat and electricity. The first German bioenergy village began in 2005 and now towns throughout the country have started to use fuel derived from substances such as wood, crops and manure.

The rationale behind such investments has been to; reduce dependency on oil; stimulate local economies; improve energy security through stable energy prices and unite communities through the involvement of local people.

Woodchip, biogas and photovoltaic

The 850-person town of Oberrospe is an award-winning bioenergy village with a cooperatively-owned woodchip burner. The burner was installed in 2008 and produces heat for 55% of the town's households. Fuel is sourced from wood and trees cut from the surrounding area and the general upkeep of the plant is undertaken by cooperative members themselves.

To ensure the town's energy needs are met throughout the year, a biogas plant running on maize and manure from local farms was installed in 2011. To add to the town's energy mix, photovoltaic panels have been fitted to the woodchip plant, generating power which is then sold to the local electricity company. The project cost €4.2 million with €1 million from the government and the remaining capital raised by the local community. Each household paid a flat rate of €6,000 to be connected to the system and with average annual savings of €400-€500 members believe their investments have been well worthwhile.



Wood-chip drying undercover before use in the Oberrospe burner to provide heat for 55% of the town's households



Site layout of the Oberrospe burner

Diverse approaches

The Holz-Schmidt sawmill heat production facility has a completely different approach. Its scale is impressive, providing 80% of the village of Schönstadt (approximately 300 buildings including schools and shops) with hot water.

This highlights the fact that there is no set formula for these enterprises. Their structure and operation is adapted to local conditions: a fact which is very pertinent to the Hamstead Marshall team where a small scale project will be most appropriate and which was emphasised in our partner meeting.

So what is a hedgerow?

The TWECOM project brings together partners from Belgium, the Netherlands, Germany and the UK and during our partners' meeting it was clear that whilst we all share the same goals of using biomass from landscape elements to increase energy security for local communities and reducing carbon emissions our approaches to managing multifunctional landscapes are highly influenced by differing ecological, social and cultural aspects.

This was highlighted in a workshop led by ORC's Sally Westaway and Jo Smith. For most partners the main landscape element to be considered in developing eco-energetic communities is hedgerows. But the definition of a hedgerow differs greatly between partners.

Belgian hedgerows, for instance, consist of what I and many others in the UK would consider to be a line of trees, considerably different to our typically shrubby British hedgerows.

Nonetheless as each partner then gave a short presentation on the ecosystem services provided by their 'landscape elements' it was clear that:

a) 'hedgerows' provide numerous functions within agricultural landscapes, including supporting biodiversity, controlling erosion, offering shelter, buffering natural habitats from agricultural impacts and enhancing aesthetic appeal;

b) maintaining such services depends strongly on appropriate, locally adapted management practices, which have a differing impact on the provision of fuel wood.

Overall we have gained insights into the history, character and services of the different partners' landscape elements and an understanding from the German situation that very different technical approaches can be viable.

As ever, understanding diversity and applying knowledge in an adaptive way is the key.



Ecosystem service provision by hedgerows

*Hedgerows are iconic landscape features and are one of the few remaining semi-natural habitats in Britain. They also provide a wealth of ecosystem services from supporting biodiversity and regulating water flow to controlling soil erosion. ORC Intern **Mary Crossland** explains some of the less well-known hedgerow functions.*

Today, hedgerows are highlighted as ecological corridors and recognised for their value to biodiversity. In the past, however, hedges played a more multifunctional role in rural landscapes, providing food, fuel and fibre to local communities. Following the introduction of barbed wire as fencing; coal, oil and gas as fuel; and agricultural intensification, many hedgerows lost their economic value, leading to hedge removal and abandonment of traditional management techniques. Consequently, the last century has seen a large decline in the presence and quality of European hedgerows. In the UK, hedgerows of ecological, historical and landscape value are protected by the 1997 Hedgerow Regulation. However, hedgerows are still in decline and generally only minimal management is undertaken. Hedgerows are therefore most commonly lost through neglect and natural degradation, becoming relict hedges or lines of trees.

The thorny issue of hedgerow management costs

Both under and over-management pose a threat to hedgerows and the delivery of their services. However as hedgerow management is generally controlled by farmers, management regimes must be economically and socially compatible with farm production if they are to be adopted. Degraded hedgerows require rejuvenation through management, such as coppicing and hedge-laying, to return them to a healthy state and to restore their functionality. But both are labour intensive and costly. Management, such as incremental increases in cutting height when trimming, can allow hedges to develop slowly through their natural growth cycle and delay the need for more costly management options. With increasing concern from the public, conservationists and rural managers to preserve and restore our remaining hedgerows, there is a need to re-incentivise sustainable management of our hedgerows. Options may include restoring multi-functionality and economic value to hedgerows through management for fuel wood or promoting the benefits of managing hedgerows for ecosystem services.

The understated value of hedgerows

Hedgerows have an economic value to farmers and society. Here are a few of the ecosystem services provided by hedgerows that are often over-looked and currently under-recognised by policy or land managers:

Functional Biodiversity

- There are more than 600 plant species, 1500 insect species, 64 bird species and 20 mammal species associated with British hedgerows¹. Hedges support such biodiversity by acting as ecological corridors, improving landscape connectivity and providing resources such as shelter, food and breeding sites.
- The value of hedges for agricultural pest control and pollination is often over looked. For example, the abundance of codling moths, a significant economic pest of

apples, depends not only on local orchard characteristics but also on the surrounding landscape including the spatial distribution of hedgerow networks². By acting as a barrier to migration and pheromone diffusion hedgerows can reduce the abundance of codling moths and their re-colonisation of orchards.

Air Quality

- Hedgerows can be used to capture and disperse airborne pollutants such as pesticides and odours from livestock. By trapping particles that filter through their foliage, hedgerows effectively intercept spray drift from cultivated fields and have been shown to reduce pesticide drift by up to 90%³. Hedgerows have also been found to be effective at dispersing livestock odours when located within 15m of the source⁴.

Microclimate Regulation

- Hedges are thought to have beneficial effects on agricultural production through the modification of microclimatic conditions such as temperature, humidity and wind speed. Due to their attenuating effect on wind speed, shelterbelts help maintain soil moisture and reduce evapotranspiration within cultivated fields⁵.
- Hedgerows can also improve animal welfare by reducing climatic stress through the provision of shelter against adverse weather. During cold windy conditions, they help reduce cases of hypothermia and mortality in vulnerable stock such as new-born lambs and in hotter conditions, shelter from the sun is given, which can improve milk yields in cattle⁶.

It is evident that hedgerow landscapes offer a diverse range of functions benefiting both the economy and human and ecological well-being. As a valuable resource to rural landscapes, hedgerows should be sustainably managed to ensure continuation of their functionality for future generations. In the face of challenges such as climate change, hedgerows are key landscape elements in the sustainability of European agro-ecosystems.

References

1. Garbutt, R.A., Sparks, T.H., 2002. Changes in the botanical diversity of a species rich ancient hedgerow between two surveys (1971–1998). *Biological Conservation* 106, 273-278.
2. Ricci, B., Franck, P., Toubon, J., Bouvier, J., Sauphanor, B., Lavigne, C., 2009. The influence of landscape on insect pest dynamics: a case study in southeastern France. *Landscape Ecology* 24, 337-349.
3. Tiwary, A., Morvan, H.P., Colls, J.J., 2005. Modelling the size-dependent collection efficiency of hedgerows for ambient aerosols. *Aerosol Science* 37, 990-1015.
4. Lin, X.J., Barrington, S., Nicell, J., Choinière, D., Ve'zina, A., 2006. Influence of windbreaks on livestock odour dispersion plume in the field. *Agriculture, Ecosystems and Environment* 116, 263-272.
5. Ryszkowski, L., Kedziora, A., 2007. Modification of water flows and nitrogen fluxes by shelterbelts. *Ecological Engineering* 29, 388-400.
6. Gregory, N.G., 1995. The role of shelterbelts in protecting livestock: A review. *New Zealand Journal of Agricultural Research* 38, 423-450.



Events and announcements

Events

6-7 January 2014: Oxford Real Farming Conference

22-23 January 2014: ORC's 8th Organic Producer Conference - Aston University, Birmingham

6 February 2014: SRUC Organic Producer Conference - Cockburnspath, Scotland.

12-15 February 2014: Biofach 2014, Nuremburg, Germany

13-15 October 2014: IFOAM World Congress 2014 - Building Organic Bridges, Istanbul.

See the events page on our website for further information on these and other events.

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