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The Organic Research Centre

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On making an organic living - a letter to Tony Blair

Dear Prime Minister

A crisis of economic sustainability is eroding business confidence in British agriculture. The organic sector - the best business, sustainability and biodiversity model we have - is not immune from this uncertainty and is fearful of the real, future viability of organic production. The list of threats to the organic sector now includes what appears to be hugely unhelpful fallout from your recent EU budget settlement.

Despite the premium price for much of their organic produce, organic farmers do not just rely on the market for their total farm income. They need (as do conventional farmers) payments to manage the countryside to deliver the myriad, multifunctional outputs that society now demands of farming.

Agriculture is a long term business requiring long term planning. The EU budget settlement of last year - under your Presidency - is set to cut nearly 20 per cent from the EU rural development budget from which environmental stewardship payments are made to such "green farmers" as the organic sector. These are the very farmers who backed steps to move EU reform away from production and commodity support to funds for environmental benefit and who assumed there was now stability in EU funding to at least 2013.

Alongside such payment and funding uncertainty, organic farmers are also at the mercy of an increasingly supermarket dominated supply chain. Tesco has already stated that its ambition is to pile organic produce high and drive down the price. That is a laudable aim for consumers, but unsustainable if producers are to stick to the true organic ethic and its attendant extra costs.

I recently visited an organic farm where a 200 cow dairy unit has been replaced by a 4000 bird laying hen unit. The free market dairy price had dropped to 19 pence a litre making two eggs worth more than a litre of milk. The cows have now gone, as have the two herdsman jobs, and the subtle patchwork of the countryside has altered for good.

Whilst realistic organic farmers have no expectation of Government led market regulation, they do have a reasonable expectation of long term Government support for the crucial job of sustainability and biodiversity delivery they have signed up to. Can you provide it?

Yours sincerely

Lawrence Woodward, Director, Elm Farm Research Centre, Newbury

In this issue

Choices about dietary health - you decide

"Food as medicine - society as a hospital"

With the huge cost of diet-related disease in the UK as its policy driver, the Government has embarked on what it calls a "personalisation" agenda. It is, in other words, an effort to make us all more individually responsible for our own eating choices and health. But is it a brave new venture in self- selecting lifestyle or a sign that national Government efforts in the areas of nutrition and diet are being abandoned to the "market forces" of consumer demand and powerful multinational food groups?

The Food Ethics Council has just published a report - "Getting Personal - shifting responsibilities for dietary health" - which attempts to answer such questions.

It concludes that personalisation, as applied to food in the UK, will not deliver a national boost to well-being as desired by the Department of Health and will fail to deliver the cost-cutting aims of the Treasury.

Instead, says the Food Ethics Council, the Government should concentrate its efforts on improving the food rights of UK citizens. And it demands -

1. Improved food labeling, better regulated food promotion and an improvement in the nutritional quality of consumer's "default" food choices.

2. A public health priority for improved social welfare to eliminate serious health inequalities and food poverty.

3. The tighter regulation of food health claims and greater corporate accountability.

4. A recognition at Government level of the social and cultural values of food, allowing consumers to eat good food with dignity and not treat foodstuffs as medicine.

At the heart of the practical problems in personalising the pursuit of a healthy diet is the lack of proper information on and around the foods we eat. Food labelling is at best confusing and at worst deceptive, so even if consumers wish to construct a healthy diet package on what basis do they do so? Many large food corporations are actively engaged in "misinformation" in the marketing and labeling of their products.

The Food Ethics Council report picks up on three key points:

a. **Healthier junk** - Very fatty, sugary and salty foods such as soft drinks and crisps are labelled as junk food. But you can buy versions of the same kind of foods that contain less of such unhealthy ingredients - diet drinks and low fat, unsalted crisps. Is "healthy junk" an improvement on "junk, junk" ?

The public health argument behind such moves is that it is easier to change the make up of food products than to change consumer behaviour.

In the United States dietary health pressures have seen the ready meal market improving its nutritional profile rather than a move away from ready meals to greater use of basic, healthy ingredients and home cooking.

b. **The single-serve solution** - Functional foods may benefit a proportion of the people who eat them. They range from innovations such as Benecol - a spread containing plant sterols that can lower body cholesterol levels - through to Heinz tomato ketchup. This food icon now has a marketing facelift in the United States with the strap-line - "America's favourite source of of lycopene". This is accompanied by the statement that "Lycopene may help reduce the risk of prostate and cervical cancer."

c. Much of the food industry's approach to personalisation mirrors the Government's own approach to public health in that it treats **food as medicine.**

The personalised marketing goes hand in hand with a focus on wellness.

Indeed the likes of Nestle, Unilever, Danone and Kraft are all busy reinventing themselves as "wellness" companies.

Nestle's head of nutrition recently explained that his ambition was to move the company "from an agrifood business to an R and D driven nutrition, health and wellness company".

In his analysis of the Food Ethics Council report, Dr Michael Fitzpatrick - a GP and health policy author - says that politicians are desperate to seek ways of showing they care about people's welfare and have hit on health in general (and food in particular) as the means of contact. And yet, he says, as "Getting Personal" points out, their current approach reduces the social activity of eating food to a personalised quest for individual survival.

"It implies that disease is the universal default status and that health can only be maintained by the scrupulous pursuit of an ascetic lifestyle." He concludes that by

medicalising diet the Government is pursuing an intrusive and moralistic policy set to diminish personal autonomy. "It is more likely to make people ill than improve public health."

Another doctor, Professor Martin Wiseman of Southampton University is depressed by the lack of real progress in UK nutrition policy over the last 20 years. He bemoans the lack of a nutrition section in the Department of Health.

His central criticism is that a personalised diet agenda cannot be divorced from the rest of an individual's lifestyle - in essence, if you take plenty of exercise you can virtually eat what you like.

Genetic issues also impinge on the food personalisation debate. The emerging science of nutrigenomics is the study of how genetic and cellular processes relate to individual nutrition and health. Within both the public and private sectors, nutrigenomics are seen to promise an individualised approach to public health, based on the principle that we all have a unique genetic make up and metabolism and therefore a unique requirement for a nutrient and food mix.

Already commercial tests are being offered to match genetic fingerprint to diet and nutrition plan, although no companies offer them in the UK at present. Researchers at the Nuffield Trust and at Cambridge University say that, at present, there is no evidence to support clinical applications involving individual dietary advice based on such gene testing.

Elm Farm Research Centre welcomes the debate flowing from this Food Ethics Council report. EFRC is engaged in food policy reform through its involvement with Sustain on such issues as child obesity and school dinner provision and ingredients, as well as in its pursuit of organic goals.

Our policy is to work towards the national provision of healthy, wholesome organic food, locally sourced, at affordable prices and to educate (or re-educate) consumers about food choice and buying, preparation and cooking.

Avian ‘flu haunts Europe (an update 20th February 2006)

The recent rapid spread of Avian ‘flu in Western Europe in waterfowl was probably caused by birds moving in response to severe weather in the Black Sea region (possibly Ukraine), where the disease has been present since last October.

Another, less likely, possibility is that the virus is much more widespread than previously thought and swans are simply acting as 'indicators'. Because of their size and colour, they are easily spotted and sick or dead individuals are more likely to be reported to the authorities than other species.

It is now clear that wild birds can spread the disease across international boundaries. The immediate risk to the UK depends on the prevailing weather in central and eastern Europe and how far the disease has spread so far.

Mute swans in the UK are not migratory, but there is a possibility that further severe weather could cause some birds to continue their westward movement to our shores. If conditions ease, birds will retreat to where they have come from. Spring migration is almost upon us, and our wintering ducks and geese (the waterfowl which appear to be the most likely carriers of H5N1) will move north and east away from the UK.

The risk that wild birds could carry the virus to the UK in the medium term is difficult to quantify. However, the continued geographic spread of the virus, particularly the outbreak in the Baltic, must mean that the risk of birds returning to the UK with the virus next autumn is higher than it has been to date.

There is now a small risk from birds arriving this Spring from Africa - we do have some waterfowl that overfly Nigeria where cases have been reported, but very small numbers - Garganey (60 pairs), black headed gull, whimbrel, common sandpiper, black tailed godwit. The 100,000s passerines/songbirds arriving via N Africa are unlikely to carry the virus or survive long enough to spread it (research has shown seven days from infection to death in small birds).

It is reckoned that the virus viable in faeces for at least seven days. If avian flu arrived in UK (through wild birds or trade) there is a risk that birds such as starlings would carry it from holding to holding on feet.

There is now growing justification for a programme of preventive vaccination in commercial poultry. The technical feasibility of this approach must be re-examined urgently to ensure vaccination could be applied practically and that it poses no risk of masking symptoms.

This is obviously a fast-moving and fluid issue. For further updates visit the EFRC websites - www.efrc.com or www.organicresearchcentre.com.

New report fuels debate on Domestic Tradable Quotas

The debate continues on Tradable Energy Quotas (*Bulletin* 81- Lean Energy). This policy instrument, developed by David Fleming as part of EFRC's Lean Economy Initiative, is attracting increasing attention. The Tyndall Centre for Climate Change Research has been evaluating its feasibility and has just published a report - Domestic Tradeable Quotas: A policy instrument for reducing greenhouse gas emissions from energy use by Starkey R and Anderson K. (2005)).

Domestic Tradable Quotas (DTQs) are a "cap and trade" scheme for the reduction of greenhouse gas emissions from energy use. Under DTQs, emissions rights ("carbon units") are allocated to and surrendered by all end-purchasers of fuel and electricity ie adult individuals and organisations. Carbon units are allocated to adult individuals, free and on an equal per capita basis, whilst organisations purchase the units they require on a national market for carbon units. Individuals with surplus units can sell them on the national carbon market and individuals who require additional units can purchase them on the market.

This Tyndall project set out to evaluate the feasibility of DTQs and their appropriateness as an instrument of public policy. The three evaluation criteria used were equity, effectiveness and efficiency. Key findings are as follows:

Equity

- Strong arguments exist within the philosophical literature on distributive justice that the equal per capita allocation of carbon units under DTQs is equitable
- DTQs should be implemented in conjunction with policies that build on existing approaches to tackling fuel poverty.

Effectiveness

- It is technically feasible to build a DTQs scheme around the existing infrastructure for credit and debit cards
- Enrolling 45 million plus individuals into a DTQs scheme might be challenging in the absence of an ID scheme but should be feasible using an approach known as "electronic verification".
- The equal per capita allocation of carbon units to individuals under DTQs may promote public acceptability of the scheme, and the scheme should be sufficiently easy and convenient for the public to use.

Efficiency

- Whilst DTQs might be seen by some as controversial and costly, the scheme is likely to be less costly than current and somewhat controversial government schemes such as ID cards and road user charging and, hence, DTQs are, arguably, affordable in public policy terms
- DTQs are likely to have greater set-up and running costs than other proposed instruments for emissions reduction but these additional costs may be justified by additional benefits relating to equity, public acceptability and the efficiency of emissions reduction.

For more information or to order copies of the booklet:

"Energy and the Common Purpose - Descending the Staircase with Tradable Energy Quotas" (priced £5 each and £3 if more than 6 copies plus £1 shipping for any number of copies) send cheques payable to The Lean Economy Connection at PO Box 52449, London NW3 9AN

The challenge of feeding cities - Soil Association annual conference January 2006

If all the world lived in the manner of Londoners we would require 3 planets to support our lifestyles. If we all lived like New Yorkers, 5 planets are needed to keep us in food, fuel and fine living. As we do not have the luxury of multiple planets it was interesting to find that the Soil Association chose *Feeding Our Cities in the 21st Century* as the title for its 60th annual conference.

Cities occupy just 2 per cent of the world's land surface yet use 75 per cent of its resources. A hungry London alone currently needs 120 times its own land area to supply it with food - that's roughly equivalent to the whole land area of the UK. The unsustainability and linear nature of urban society, with its fossil fuel powered industry, transport and farming systems, was a constant theme of all the plenary speakers. But despite some fine presentations the feeling persisted that none of them had really come to grips with the subject.

Nonetheless, some interesting points were made.

Jonathon Porritt, chair of the Government's Sustainable Development Commission, urged new thinking for cities and for the agriculture and other rural industries supplying them. He fears that farmers in particular have yet to appreciate the enormous policy changes that have engulfed them. There is a whole new currency out there, he says: "Farmers must wake up and smell the carbon".

London Mayor Ken Livingstone said the city had come a long way from its world dominance in the 19th century, when London was the world's biggest city and "a great pioneer in unsustainable development". But there was still much to be done in such areas as better hospital food, improved school meals and the drive for more farmers' markets including some which are all organic.

"Tinkering at the edges" was the phrase that came to mind though when one remembers that there are still council wards in London where no fresh food is available and food inequalities bring major inequalities in health. If you live in the depths of East London you are twice as likely to die of heart disease as a resident in the affluent West End.

It was therefore heartening to learn about a local school meal revolution described by Hackney primary school headmaster Alasdair Friend. Over the last four years he has overseen a complete redesign of school catering from breakfast clubs to in-house cooking of fresh, wholesome (sometimes organic) school lunches. Much of the vegetable content comes from Eostre Organics (which has EFRC's research site Wakelyns as a supplier). Close on 90 per cent of pupils and staff now eat a cooked lunch (he has no obese pupils) and academic results have shot up too.

We have much to learn from Rome, says Professor Kevin Morgan of Cardiff University, where a revolution in school meal provision has already taken place. Each day 180,000 lunches are prepared from fresh, local produce with the triple aims of producing healthy, alert children; food aware consumers for tomorrow; and a real boost to the local food chain. Rome City council is directly funding about 50 per cent of the cost. Interestingly one of the few non-local ingredients is Welsh lamb.

Garden guru Monty Don spoke about his own and other's experiences of growing produce as a therapeutic and life enhancing activity. He is currently working with young drug addicts, attempting to enhance their lives through involvement in market gardening and eating wholesome food. It seems to be another model of "Care Farms", demonstrating how engagement with the outdoors and nature can profoundly improve our well-being.

It was a theme taken up by EFRC Trustee, Prof Hardy Vogtmann, who urged that cities must get closer to nature with great potential for conservation within and around cities. He was particularly keen for cities to develop far more circular models of resource use rather than the standard linear models of today.

Surprisingly this was one of the few times that the need and possibility of fundamentally restructuring cities and suburbs was mentioned. Alternative models to cities like London and whether there is a more realistic, sustainable way of accommodating 10 million people were not discussed and both past and current attempts to change towns and cities - for example the garden city and urban farming movements - received little attention.

The Soil Association should be commended for thinking of looking at the issue and it certainly makes sense in the context of their school meals and food for life campaigns. It is an enormous issue with enormous consequences and a wide range of individuals and organisations will have to engage it before we will be able to work out sustainable solutions.

Richard Sanders and Lawrence Woodward

CONFERENCE DUST UPS

or notes from Richard Sanders and Lawrence Woodward

Away from the main conference theme and well away from the harmony generated by a stunningly excellent artisanal lunch prepared and served by producers themselves - it was billed as a slow food lunch but there was so much that was good and so many people all trying to get at it at the same time that there was some scrummaging more fitting of Twickenham rather than the slow food movement (on the other hand it might be that the piggy people created the scrums around them and everyone else was cool - anyway, away from that, there were some impressive rows.

Dust Up 1:

Conference main sponsor Thames Water was rewarded with a workshop all to itself to subtly present the case that **sewage sludge** should be allowed in organic farming. With marine dumping of sludge now banned, water companies do have to find a use/outlet for this material and a superficially logical argument points to its use as closing one important organic fertility cycle.

In fact, all water companies are having problems persuading even conventional farmers to use sludge. (In Germany its use is banned on conventional as well as organic farms). They would certainly like to persuade organic farmers to use it and therefore the standards and regulation needs to be changed. It is not so much that organic farming would be able to use significant volumes but that acceptability by the organic sector would give it a wholesome aura it is currently lacking.

Thames Water certainly had their supporters, including from some consultants who ought to declare an interest before giving opinions on the issue, but others were not convinced.

Delegates were split on the merits of using this material for nutrients and organic matter making a clear distinction between true "night soil" - human waste mixed with straw etc. and modern sewage sludges which also contain detergents and other household and industrial chemicals. It is reckoned that an average sludge application to farmland contains up to 2kg of copper - a rate which would cause concern if used as a fungicide.

DUST UP 2:

Another contentious subject for workshop debate was **organic aquaculture**. "The nearest thing we have to organic feedlots," said Peter Kindersley, well known for his vocal opposition to organic salmon farming. The workshop approach was trying to examine ways of improving the acceptability of salmon farming through making it part of an integrated production system. Speakers from Canada and Scotland described work on co-production of shellfish and kelp alongside salmon farming to make use of food and other wastes, especially nitrogen, from what they term the "leaky fish" that salmon represents. Some people thought that they presented promising results in closing this nutrient cycle but these were highly controlled research trials and so far away from what is currently happening they are of little relevance.

The Soil Association and other certification bodies have yet to come up with any kind of credible answer to the question that if salmon farming is so problematic and needs fundamental development in so many critical areas why are they are certifying it?

DUST UP 3:

Heated discussion was also the order of the day at the workshop session on **organic poultry.** Poultry farmer and expert, Andrew Gunther, drew attention to the fact that there is currently no organic breed for table bird production and that breeds being used are essentially conventional breeds reared organically. All such stock originates from highly industrialised breeding flocks. Discussion also focused on the level of derogations given to organic poultry producers by the Soil Association and others, including those allowing conventional chicks which threaten the livelihoods of organic chick producers.

Andrew, with the theatrical flourish worthy of Barnum and Bailey, produced a certified organic chicken he had bought from Marks and Spencers with hock burn and breast blisters clearly visible. One could not argue with the contention that such things resulted from the plethora of derogations that allow neo-conventional production to be certified as organic. Defensive arguments from members of certification bodies failed to quell the sense of shock and outrage that overcame the audience.

Delegates agreed that we must move quickly forward on these issues to resolve them as quickly as possible so that organic poultry production can be more sustainable and closer to the true organic ethic in the future.

Living with Biodiversity and Productivity - a rationale for much of the EFRC research programme

The place of biodiversity

The human population cannot survive on this planet without massive amounts of biodiversity - in terms of both numbers of species and quantity. Clean air, clean water, recycling of organic matter and the provision of food (the ecosystem services) are all dependent on numerous, intricate and related webs of biodiversity.

The scale of this fundamental dependence and the threats surrounding it has been largely overlooked until recent years. One reason for this oversight has been the development of cheap energy and of technologies, dependent on that cheap energy, which can substitute for some of the ecosystem services. For example, in agriculture, there is synthetic conversion of nitrogen to nitrate, the form of nitrogen available to plants for protein production and thence to us. In addition to the energy cost, this creates massive pollution and global warming problems in its wake (for example, see New Scientist, 21 January 2006).

Such developments have meant that we have been able

to support, more or less, the continuing massive increase in the human population and its activities. As one example in UK agriculture, average wheat yields as recently as 60 years ago were 2-3 t/ha harvested by reaper-binder: now, 8+ t/ha comes out of the combine harvester, but at a much increased, and increasing, cost. The attendant problem is that we have gone too far in removing and substituting biodiversity by methods of increasing productivity based on fossil energy. Conventional agriculture, and indeed, organic production have to change towards methods and systems that are more ecologically sustainable. Organic agriculture, using legume-based systems, does try to use and encourage biodiversity - but it has to go much further to improve both biodiversity and productivity.

It is these kinds of argument that form the background to much of the current EFRC research programme. Even with our small size, we have to develop a set of integrated projects in genetics, ecology and agronomy that aim simultaneously to improve both productivity and biodiversity - ideally, by using the latter to increase the former.

The question of cereals - our main food crop

Current production of our staple cereals has developed through major changes in agronomy (machine power, synthetic fertilisers and pesticides etc.) which, in turn, is dependent on selection of totally new wheat varieties adapted to these conditions (including industrial end-processing). The principal adaptation has been in harvest index - selecting for the effects of dwarfing genes to ensure that a larger proportion of the plant biomass is distributed towards seed rather than straw production, thus exploiting the giant increase in synthetic fertiliser, and fossil energy, use. Little or no attention was paid to ecology during this development, or to biodiversity.

This commodity approach has had many consequences, one of which is that attention has been diverted away from the wider range of crops that are needed for a varied human diet, effective crop rotations, efficient local food systems and the maintenance of biodiversity in the countryside. It has also meant that plant breeding in the UK, as a private sector activity, has had to specialise increasingly in a handful of major crops for 'conventional' production. Inevitably, the new crop varieties that are available to farmers, though well adapted to conventional production, are less suited to organic or sustainable systems.

We were able to prove this last point through our participatory research project (see page 8). Working with a number of organic wheat growers around the country, we confirmed our earlier indications from small plot trials, that, for organic farming systems, the variation in wheat yields was affected much more by site and year than by variety. In other words, wheat yields were not only lower under organic than under conventional conditions (in contrast to oats), but there was no difference among the available varieties bred for conventional production. Interestingly, however, genetic response overall to environment was large. For example, in 2004, the varieties we used were all significantly taller in the trials in the east of the country than in those in the west. Conversely, in 2005, with much higher yields nationally, all varieties were significantly taller in the west than in the east.

Plant Breeding

So, one objective of a Defra project involving ourselves and the John Innes Centre is to try to replace 'conventional' varieties of wheat by new forms that are well-suited to organic production, as quickly and as cheaply as possible. Instead of producing pure line varieties selected under a regime of synthetic inputs, we have produced a series of populations based on all the possible combinations of inter-crosses among nine high yield and 12 high quality varieties that have been successful on a large scale over the last fifty years. Naturally occurring male sterile lines are included in some of the populations to further increase the genetic variation in the populations. These populations, containing large amounts of genetic variation, are being exposed to different management systems (organic and non-organic) in different regions and countries. The outcome should be rapid adaptation to local conditions ("evolutionary plant breeding"). The project is still young, but the early results are encouraging.

Following two years of plot trials, we are now working with a small group of farmers from the participatory project, who are growing and multiplying some of these highly biodiverse populations on farms in different parts of the country. In assuming that this approach will deliver useful results, we have started to extend it to other crops including oats (through the OatLink project, page 10) and to einkorn, one of the ancient progenitors of wheat, through material provided by Dr Geza Kovacs in Hungary. Ideally, of course, in addition to crops, we should really be developing parallel approaches with our farm animals.

Biodiversity and agronomy

Developing this novel genetic material is only a first step. It needs to go hand-in-hand with research to determine the best ways of growing the material in practice. For this reason we have established a new Defra Link project on wheat agronomy to investigate

simultaneous variation in seed rate, method of sowing (narrow rows, wide rows, broadcast, or in strips using the new Claydon system), presence or absence of a clover intercrop and wheat genotype, which will include the populations from next autumn. This multifactorial approach is new to organic production in the UK.

There are, of course, many possibilities based on the idea of inter-cropping. Large scale monocultures, developed over the last 50 years or so, have illustrated repeatedly how they encourage rapid development of diseases and pests, and the evolution of new, adapted races of the organisms involved. Even a change towards the simplest form of inter-cropping, by growing three or four different varieties as a mixture, can lead to a dramatic reduction in the rate of disease or pest development. This has been demonstrated now for different crops on hundreds of thousands of hectares. Our biodiverse populations and legume intercrops should carry this principle a major step further.

Inter-cropping different species, particularly if each species is grown as a mixture or population, mimics the natural world where we know that complex plant and animal populations are often highly productive and well-buffered against environmental change. The challenge is to maintain such complex populations in agriculture at a level which increases productivity while remaining manageable, particularly in terms of harvesting the produce.

Organic Agroforestry

At the extreme, agroforestry systems, in which tree, crop and livestock management are fully integrated, represent the highest level of diversity in agricultural systems. In my view, this is what organic agriculture should aspire to because of the wide range of integrated benefits for productivity and biodiversity.

At its simplest and most common, at least in temperate regions, an agroforestry system comprises narrow strips of trees aligned north-south ('production hedges'), separated by a cropping strip ideally in the range of 12 to 48 m wide. At Wakelyns Agroforestry, we have established such systems based on hazel, willow, mixed hardwoods or fruit and nut tree combinations. Hazel is an out-crossing plant so that the hedges represent a highly variable population; the willow hedges are grown as a mixture, highly effective in restricting rust development. The mixed hardwood systems are based on seven species (ash, hornbeam, Italian alder, oak, sycamore, small-leaved lime and wild cherry), or the same seven with apple distributed among them, again to try to restrict pest and disease spread. There is also a plum and walnut system. In the silvo-poultry system at Sheepdrove Organic Farm, the trees provide shelter for chickens and an appropriate space to grow an herbaceous under-storey comprising plants that are known to be beneficial for the chickens. The areas occupied by the chickens are part of a crop rotation between the tree lines.

Agroforestry systems are more difficult to manage than monocultures, but they return more, in numerous directions. Apart from shelter for animals, crops and humans, together with nutrient re-cycling, the trees act as 'beetle banks' to encourage production of beneficial insects. They can also provide, in addition to the expected crops in the organic rotation, a wide range of wood outputs, valuable both as a raw material for many different kinds of structure and for energy production on the farm or locally. It also seems likely that such combinations of plants should provide a positive contribution to global climate change (carbon sequestration; reduced fossil fuel use) and a buffer against the changes that do occur. The diversity of outputs from such systems also help to buffer against variation in market prices while helping to provide the essential diversity of produce needed for local, energy efficient, food systems.

Conclusion

It is probable that well-designed biodiverse systems using appropriate plant and animal components selected for productivity in such systems can go a long way in reducing fossil energy dependence and greenhouse gas emissions. The larger question is whether, at the same time, their overall productivity could be sufficient to deal with the increasing size and aspirations of the human population, world-wide. The evidence from advanced and intensive forest garden systems is that they can.

Prof Martin Wolfe
Research Director

Tough job growing organic winter wheat for millers

Quality results from participatory farms have revealed an increase in Hagberg Falling Numbers and specific weights from the previous season to a level over the threshold required by millers. But they also show a decrease in protein concentration.

Bulletin 81 (December 2005) contained the yield results from the second year of the Defra-funded project OF0330 (Developing appropriate participatory methodologies involving farmers, researchers and seed suppliers working in partnership on varietal performance

and seed quality research) which involved 12 farmers across the country growing the winter wheat varieties Hereward, Solstice, Xi19 and their 3-way mixture. It was reported that, as in the previous year, yield variation among sites was a lot greater than that among varieties. However, the average yields were higher than those of the previous season.

As with the yield results, the largest differences were in the grain quality parameters - thousand grain weight (TGW), specific weight, Hagberg falling number (HFN) and protein were found among sites. However, there was also a significant difference in specific weight among varieties (Table 1), and a significant interaction between site and variety found in the TGW results (i.e. the relative TGWs of the varieties differed among sites).

Table 1. *Quality results of varieties in 2004/05 compared with the overall mean in 2003/04*

	Hagberg Falling Number (s)	Protein (%)	Thousand grain weight (g)	Specific weight (kg/Hl)
Hereward	240	10.2	44.8	79.5
Solstice	256	9.5	45.1	79.7
Xi 19	279	9.5	47.3	76.3
Mixture	248	9.7	45.3	78.7
Mean 2004/05	**256**	**9.7**	**45.6**	**78.5**
l.s.d.	49	1.5	0.22	0.9
Mean 2003/04	**226**	**12.0**	**49.8**	**71.9**
l.s.d.	11	0.6	2.53	0.7

**If the difference between means is greater than the l.s.d. then it is a significant difference.*

Although there were no significant differences among the HFN results of the varieties, on average HFNs were higher in 2004/05 than the previous season (Table 1). The low HFN results in 2003/04 can be attributed to the wet summer causing grain to sprout and HFNs to drop.

Unlike the HFN results, the average percentage protein was lower in 2004/05 than 2003/04 (Table 1). However, if the protein harvested per hectare is calculated using the yield results, it can be seen that, in fact, the yield of protein per hectare increased by 16 % (0.06 t Ha-1) between 2003/04 and 2004/05. The reason that the protein percentage fell between the two years was because the carbohydrate in the grain increased by a greater proportion (47 %).

This confirms that the weather difference between years affected the carbohydrate producing potential of the crop more than the protein producing potential because the latter is much more dependent on available soil-bound nitrogen. Also, the nitrogen scavenging ability of the modern wheats is not as effective as the carbohydrate producing mechanisms.

Most of the varieties achieved the milling requirement for HFN (>250s) and all made the requirement for specific weight (>76 kg/Hl); an improvement on the previous season. However, in common with last year, none of the varieties met the protein level required for a milling premium (>13%), and, in fact, protein contents were lower this season than 2003/04.

These results, along with those of yield reported previously, again highlight the variability of organic systems and the difficulty of achieving protein concentrations required by millers among conventionally-bred varieties grown under organic conditions.

Organic Eprints: Access to Organic Research Workshop

A workshop for researchers, advisers and others interested in accessing organic research results, uploading their own research and publications in a public archive and keeping up to date with the latest in organic R&D.

Organic Eprints, the new web-based database for organic research at www.orgprints.org accepts scientific papers, conference papers, theses, reports, books and book chapters, magazine articles, web products, project descriptions, and other published or unpublished documents on the subject of organic research. The database has an open access policy, which means it's open to anyone with access to the internet. The database search facilities are excellent and provide immediate access to a huge range of research material from crop health and food quality to genetics, soil biology and animal husbandry.

A free training workshop on using Organic Eprints, to be held at the Warwick University Science Park on Tuesday 28 March 2006, is funded by DEFRA and organised by the Institute of Organic Training & Advice (IOTA). It will show what the archive has to offer and provide some practical hands-on experience with uploading, searching and downloading research material on internet-connected PCs.

If you would like to attend please contact Sarah Jameson at IOTA for further details, email: iota@newinvention.plus.com) as soon as possible.

New oat variety a competitor for an old favourite?

Gerald, the oldest oat variety on the HGCA Recommended List, has out-yielded all other varieties in the first year of organic trials for the Defra and SEERAD sponsored Sustainable Arable LINK project, 'OATLINK', although a brand new variety, Tardis, came a close second.

Elm Farm Research Centre is currently involved as the organic partner in the OATLINK project. This project, led by IGER, Aberystwyth, aims to incorporate important traits into the oat crop through combining 'conventional' phenotypic selection with molecular marker technologies. Key traits of oats for human consumption and poultry feed are being selected to meet the needs of millers and the poultry industry within sustainable agriculture including organic production. The other partners of the project are SW Seed Ltd, BOBMA, HGCA, the Roslin Institute, Bernard Matthews Ltd, British United Turkeys Ltd, the British Poultry Council, ADAS, GB Seeds and Oat Services.

Last season saw the first trials of oats for organic production. Two trials, one of husked, and the other naked oat varieties were established at Wakelyns Agroforestry, Suffolk, in October 2004. The husked oat trial involved 4 current varieties (Buffalo, Gerald, Kingfisher, Penderi) and 2 new varieties from IGER, Tardis and the provisionally named Brochan. The naked oat trial included 3 current varieties (Expression, Grafton, Hendon) and a new high oil variety, Racoon, along with all their two-way mixtures. The experiments were of a replicated split-plot design with 2.4m x 10m split plots.

Husked oats

The husked oat experiment established well. There was a highly significant ($P < 0.001$) difference among the varieties in the number of plants that emerged, but the number of plants that actually established did not differ (Table 1). Therefore there were differences ($P < 0.05$) in the percentage of plants that survived, with Tardis having the highest plant survival percentage, and Buffalo the lowest.

When crop ground cover was assessed in April, differences ($P < 0.001$) among varieties were found (Table 1). Penderi had the lowest crop cover with only 43.5%. However, despite varieties differing in crop cover, the percentage of weed cover of an area was not affected by variety.

There were significant ($P < 0.001$) differences in yield among the husked varieties (Table 1). Gerald and Buffalo yielded the highest and lowest, respectively, with the new variety, Tardis, doing well. However, the relative yields of the varieties could not be explained by how the varieties established or the crop cover earlier in the season, rather yields could be partially or wholly attributed to the shortness of the variety (Table 1) which affected a variety's competitiveness against weeds.

Husked Variety	Establishment (Plants/ m^2)	Early crop cover (%)	Crop Height (cm)	Yield (t ha^{-1} @ 15%mc)
Gerald	189	50.6	82.8	8.48
Tardis	166	54.9	80.6	8.28
Penderi	164	43.5	70.4	8.19
Kingfisher	171	60.8	96.6	8.05
Brochan	177	62.3	79.8	7.78
Buffalo	184	55.6	54.6	7.53
SED (33 df)	**10.6**	**3.82**	**1.59**	**0.200**

Table 1. Establishment, early crop cover, height and yield of husked varieties at Wakelyns

Naked oats

The naked oats took longer to emerge than the husked varieties and did not establish as well, leading to fewer plants per m2 (Table 2). In contrast to the husked material, there were no differences in emergence counts between varieties or variety mixtures, but there were significant differences in the number of plants established (Table 2). However, this was not due to any significant differences in the plant survival percentage.

Naked variety/ mixture	Emergence (Plants/m^2)	Establishment (Plants/ m^2)	Plant survival (%)	Early crop cover (%)
Expression	132	95.3	81.1	34.5
Grafton	171	100.0	65.5	45.8
Racoon	138	95.5	72.8	49.9
Hendon	121	81.8	88.6	29.1
Grafton/ Expression	154	117.0	79.4	52.4
Expression/ Racoon	139	106.8	78.4	50.0
Hendon/ Expression	124	82.8	69.7	36.8
Hendon/ Grafton	133	96.8	74.4	41.8
Grafton/ Racoon	130	92.5	74.5	51.1
Hendon/ Racoon	136	87.8	65.2	39.9
SED (54 df)	**19.3**	**9.59**	**12.71**	**6.65**

Table 2. Emergence, establishment, plant survival and early crop cover of husked varieties at Wakelyns

Largely because of the lower emergence, the percentage ground cover of the naked oats was generally less than that of the husked oats (Table 2). Nevertheless, the crop cover of the naked oats did differ among varieties ($P < 0.001$). For example, Hendon had a particularly limited

ground cover at only 29.1% (Table 2). It can also be seen that the crop cover of the variety mixtures was as high as, and usually higher, than the component varieties.

The naked varieties yielded less than the husked varieties (Table 3), which may have resulted from the relatively poor establishment. As with the husked oats, there were significant ($P < 0.001$) differences among the varieties (Table 3) with Expression the highest yielding variety. Mixtures with Expression as one of the components also performed well with two of the mixtures yielding particularly highly; Expression/950-240 and Grafton/Expression yielded 9% and 8% higher than their component varieties, respectively. However, Grafton/95-240 yielded 7% less than its component varieties.

Again the shortest variety, Hendon, gave the poorest yield (3.84 t ha-1). Hendon also had the lowest percentage crop cover earlier in the season (Table 2). However, relative yields were not always related to crop cover. For example, Expression had a very low crop cover early in the season but went on to be the highest yielding pure variety.

Since these results are only from the first year of this project, it is not possible to make firm recommendations. However, the husked varieties generally performed better that the naked varieties throughout the season, from establishment to final yield, and the tall varieties out-yielded the dwarfs. New varieties, especially Tardis, also performed promisingly. Experiments have been planted this season to confirm these results, and other potential new lines are being tested by Elm Farm.

Variety	Crop Height (cm)	Yield (t ha^{-1} @ 15%mc)	Expected mixture yields (mean of parents)	Percentage difference to means
Expression	100.3	5.43	-	-
Grafton	98.3	4.83	-	-
Racoon	112.7	4.05	-	-
Hendon	51.2	3.84	-	-
Grafton/ Expression	101.8	5.54	5.13	108%
Expression/ Racoon	108.0	5.15	4.74	109%
Hendon/ Expression	89.4	4.51	4.63	97%
Hendon/ Grafton	82.6	4.41	4.33	102%
Grafton/ Racoon	104.9	4.13	4.44	93%
Hendon/ Racoon	96.3	3.93	3.95	99%
SED (57 df)	**3.81**	**0.303**	-	

Table 3. Heights and yields of naked varieties and mixtures at Wakelyns. Also the expected yields of the mixtures and the percentage difference to actual yields.

Further information can be found at www.efrc.com or the OATLINK website, www.iger.bbsrc.ac.uk/OatLink/. This project is sponsored by Defra and SEERAD under the Sustainable Arable LINK programme.

Dr Sarah Clark and Dr Hannah Jones
Researchers,
EFRC Crops Programme

Dreaming of dream farms for the UK

True sustainability for UK farms was on the agenda at a workshop, part sponsored by EFRC, held at Sheepdrove Organic Farm in January as some 30 delegates, debated the notion of *Dream Farms.*

The purpose of the workshop was to discuss the pros and cons of setting up a demonstration farm that uses technologies that enable the full farming system to be self sufficient in food, water and energy. Speakers shared experiences of establishing a number of these types of farm in developing countries.

Lois Philipps', EFRC Senior Researcher, presentation used the EFRC/Sustain report *Eating Oil* as a starting point of why we need to be concerned about resources. Offering organic farming as a potential solution. She used case studies for energy and water to highlight areas that had both positive and negative implications.

Three technical presentations dealt with biogas, harnessing methane and solar panels for greenhouses, demonstrating that there was a range of technologies that could be employed in a 'Dream Farm'.

The workshop concluded with a presentation from Julian Oram from Action Aid focusing on why empowerment of food and energy supplies was becoming more and more critical as the power of the multi-national companies increases.

Other speakers included: Dr Eva Novotny putting the case for a dream farm to consider effective micro-organisms and Richard St George from Schumacher College Bristol showing the benefits of Environmental Universities.

Learning to link farmers and scientists

Insights into the processes of on-farm participatory and interdisciplinary research and farmer learning have been revealed in a Rural Economy and Land Use (RELU) scoping study carried out by Middlesex University and Elm Farm Research Centre. 'Learning and research for sustainable agro-ecosystems by both farmers and scientists' (RELU 01) was based on the premise that farmers can play important roles in knowledge production, either through their own research or through involvement in research with scientists. The objectives of the study were to explore how farmers learn, how researchers can examine whole systems and carry out interdisciplinary research, and how farmers and researchers can collaborate.

In total, 10 cases of farming enterprises working with scientists were examined. These were selected from existing and completed research projects, and while some cases involved research for the organic sector, other interesting examples of businesses participating with researchers for development of sustainable land use technologies were also selected. Within each case study, semi-structured interviews took place with four individuals having differing roles within the project.

How farmers innovate, learn and develop farming systems

Farmer learning was found to be carried out through reflection, networking and with advisors, and innovation generally depended on the character of the individual. Farmers were found to be involved predominantly in incremental changes such as trying new varieties and often experiments occurred by chance or unintentionally. Farmer research was also found to be carried out subconsciously and formed part of the farmers' tacit knowledge.

Farmers often had a different concept of verification of results to the researchers, with validation coming from inter as well as intra farm replication. Therefore, farmer networking is an important part of their learning processes, as are the roles of advisors who can compare treatments on different farms.

Collaboration and interdisciplinary teams

Since interdisciplinary and participatory research brings together people from varying backgrounds, disciplines, skills and perspectives, the different types of researchers interviewed naturally had different agendas when it came to what they wanted out of the project. Commercial technology company scientists wanted to have ideas that could be converted into profitable businesses; pressure group scientists wanted to disseminate research rapidly; more academic researchers may want results to be disseminated through publication in peer-refereed journals; and finally contract researchers had specific funding pressures and tight deadlines in which to complete particular projects.

In each of the cases studied, issues of co-operation were based on interpersonal trust. Trust was found to be shaped by issues of information on others, sanctions and common norms. The information on others was from existing relationships, from intermediaries, or is built up through working together. The hesitation in replies to questions and the difficulty in explaining trust-based relationships demonstrated the instinctive nature of trust relations with people habitually trusting others as they have sanctions over them (and information on their reputation) that might not be drawn on consciously.

Scientist involvement with farmers in interdisciplinary agro-ecosystems research

The case study projects demonstrated a range of different types of interaction with farmers. A key role was played by individuals who acted as boundary spanners with an understanding of the needs of both farmers and scientists, bringing disparate groups together and ensuring clear communication.

Farmer participatory research was not found to be cheaper or quicker. Rather than investing in equipment and experiments, it required a lot of staff time to develop relationships with farmers and other researchers. The difficulties of ensuring statistical rigour when working with farmers was mentioned by four of the cases as farmers often changed treatments inadvertently.

Conclusions

The findings present insights into the process of inter-disciplinarity and trans-disciplinarity. The study of farmers own research found that while formal science has to ignore local complexity in order to generate a technology for a wide recommendation domain, farmers' research is based on local complexity, with farmers having to cope with many conflicting demands.

The process of carrying out interdisciplinary research involving farmers is shown to be dependent on a range of relationships that are shaped by both power and trust. There are challenges of bringing disciplines together, although funders were found to be important factors in encouraging people to work across the disciplinary boundaries.

The project found that there are degrees of farmer participation with differences in the extent to which researchers hand over power to the farmer in terms of the design and evaluation of the experiment or research. Relinquishing power was found to be in conflict with the need to have statistically rigorous research as farmers may not ensure that treatments remain unchanged through the research.

The specific lessons coming out of this research for researchers, policy makers and others include:

- The need to ensure good communication and team building between researchers and with farmers. This takes time and is often not costed into research proposals. Short term funding also limits these relationships.
- Farmers' own research and holistic assessments of technologies and practices can make a vital contribution to knowledge production although its approach can be very different to scientific method.
- Farmers and different types of scientists have differing agendas that have to be negotiated.
- The ability of some researchers to be involved with interdisciplinary participatory research can be limited by institutional pressures (such as the need to publish in academic journals) unless there are alternative incentives and specific funding for interdisciplinary projects.
- Boundary spanners who have an understanding of the needs of scientists and farmers may be required to facilitate the development of relationships.
- For projects that will involve statistical analysis, the selection of sites should take into consideration the likely loss of some sites from the research due to the uncertainties of farming. Statistical advice should be sought from the start.

The full version of this report can be found at http://www.efrc.com/manage/authincludes/article_uploads/RELU%20shortreport.pdf and www.mdx.ac.uk/www/ceedr/esrc.htm

Dr Hannah Jones, Dr Sarah Clark, Kay Hinchsliffe

Working together on Atlantic fringe

At the beginning of 2005 Organic Centre Wales (OCW) began work on an **Interreg Project** in partnership with three other EU member states and other regions of the UK. A considerable amount of work went into the preparatory work with the first seeds of the project being sown back in 2003.

The project has now been running for just over a year. The geography of the project has been influenced by the fact that the EU is divided into regions with similar characteristics for the purposes of funding. The Atlantic Area (or Atlantic Arc as it is sometimes known) is essentially the western maritime fringe of the EU and is seen as being potentially disadvantaged by its peripheral position.

RAFAEL is an acronym that must have involved some fairly contorted thinking when it was devised. It stands for 'Renaissance of Atlantic Food Authenticity and Economic Links' and probably means different things to different people. The main aim of the project is "to enhance the identity and economy of the Atlantic Area by the concerted promotion of authentic food systems". The concept of 'authentic food' refers to people focussed, local, sustainable, distinctive and traceable food and products that preserve the identity of the Atlantic regions. The OCW point of view is that it should provide a platform for the promotion of local procurement of organic produce along with a parallel programme of education in the issues of food authenticity.

The RAFAEL partnership involves public and private sector organisations from 9 Atlantic Area regions, across 4 countries: Spain (Galicia, Zamora, Andalucia), Portugal (Alentejo, Tras-os-Montes e Alto Douro), France (Brittany), and the United Kingdom (Wales, Ulster, SW England). There is a clear range of climate across this area but there are historical resonances particularly with respect to Celtic culture, a fact that helped to persuade the Welsh Assembly Government to provide some match funding.

A core part of the programme identifies and records current examples of local food production and distribution. This will allow the identification of areas of good practice and innovation that can be communicated between partners. These activities will underpin the development of an information network, and the identification of new opportunities for the production and supply of authentic/local food. It is also hoped to develop opportunities for the wider distribution of Atlantic Area produce and food products. In addition to the collection and exchange of information, a programme of technical exchange visits is underway and a recent visit to the Alentejo Region of Portugal is described below.

The objectives of the **technical exchanges** are for practitioners and advisors to visit a number of production enterprises to get a sense of the range and developmental stage of the authentic food sector in the region being visited. It was with considerable interest that I joined OCW colleagues on a flight to Lisbon for the technical exchange visit to Alentejo. The region occupies much of the southern half of Portugal and lies to the north of the relatively narrow coastal strip of the Algarve in the south. It has an Atlantic coastline but its overall character is determined by broad landscapes made up of cork-oak woodland, wheat-fields, vineyards and olive groves. It is a very rural region, sparsely populated.

Much of the two-day stay was taken up with visiting various food production enterprises and talking to the producers. There was also a cultural element that had been included to promote the region on a wider level than just authentic food production. It was clear that as the visit progressed we were looking at a situation that was very different from that in the relevant regions in the UK. There was clearly a very strong authentic cuisine that was evidenced in the meals that were provided for participants but the concept of certified organic food was almost absent as far as local markets were concerned.

There was a greater interest in Portugal as a whole as we were told by the manager of a large olive oil processing facility, roughly 10% of whose annual throughput of 2 million litres of virgin olive oil is certified organic. All of the oil from this modern plant that is run and owned by a growers co-operative is sold on the internal market - Portugal has to import a considerable proportion of olive oil from Spain to satisfy home demand.

We visited two very different wine producers. The first was very small scale and part of the winery was still based on techniques introduced by the Romans - fermentation takes place in huge terracotta vats. Part of the output was authentic and part was organic. The second winery was industrial by comparison with a large output, much of which is exported to a wide range of countries. Some organic grapes were processed but it was a small proportion of the total. The proprietor also kept a herd of organic cattle and told us that he had spent the profits from the next two years in buying in forage for his stock. The extreme drought in the area had meant there had been no useful grass growth for a year or more.

After two days of visiting producers and sampling the local culinary delights (and they were very good) some 40-50 visitors and local representatives met for what was intended to be the main focus of the visit. This was a workshop on "How to innovate in establishing food supply chains in organic and sustainable farming" that was to include round table discussions and presentations from producers in some of the participating regions. What we actually got were speeches from local politicians, a review of the project, a presentation that described the Portuguese certification body (Agrobio) and some input from producers. The round table discussions did not happen as the hosts though it more important to show us around the local town of Evora.

It was something of an anticlimax, although some of the presentations were interesting. The problem arose from the very keen desires of our hosts to promote the region as a whole and to seek support from as many sources as possible. The Alentejo region occupies around 25-30% of the total land area of Portugal and yet apparently only has 3 members of the Portuguese parliament to represent it (and only 1 MEP). Overall the visit served a very valid purpose by demonstrating that that there are still wide differences in the development of local organic markets across the regions involved. I think there is much that we in the UK can do to help them promote organic food but equally they have much to teach us about authenticity.

Roger Hitchings
Head of Advisory Services

Energy use and greenhouse gas emissions in food and farming

Climate change due to global warming as a consequence of burning fossil fuels is an incontrovertible fact. It is estimated that, in the UK, agriculture is responsible for 7 percent of the greenhouse gas emissions due to fossil fuels. Reserves of fossil fuels are finite, production has peaked and supply will be severely restricted in the next twenty years, disrupting our global economy.

EFRC's **Organic Systems Development Group** - a group of leading organic farmers with a shared interest in developing their farming systems - met at Commonwork Organic Farm (www.commonwork.org) in November 2005 to discuss the whole issue of energy use and emissions in organic farming. This paper summarises our discussions.

First let's look at how food and farming influences energy use and green house gas emissions. See table 1.

Energy Use
o Transport of food and farm inputs o Manufacture of Nitrogen fertilisers (49MJ/kg fertiliser) and pesticides o Crop drying and storage o Cultivations and machinery operation, including mechanical weeding, harvest and forage conservation o Field operations such as haulm burning, flame weeding o Dairy facility operation o Packaging o Transport for labour o Manufacture of machinery and buildings o Produce preparation and processing
GHG Emissions
o Ruminant production of Methane o Manure production of methane and ammonia o Soil production of nitrate and ammonia o Plastic waste o Other waste including organic o Oxidation of organic matter, notably from soils and destruction of woodland
Carbon sequestration
o Soil organic matter o Trees

Table 1. Energy Use and GHG Emissions in Food and Agriculture

Clearly the significance of particular emissions will vary according to the farm enterprise or system. Looking at the food and farming system as a whole, the over-riding impact comes from our food distribution and transport, fostered by free trade policies, exploited by the major retailers and bought into by consumers. Not only is this crazy system rapidly using up finite resources, it is a major contributor to global warming and is the absolute priority to be dealt with. Also of major general importance is the imperative to stop ploughing permanent pastures and felling forest.

Within the farm gate, by far and away the most significant factor is the energy used in nitrogen fertiliser manufacture; not an issue for organic farmers of course.

So what can farmers do?

The profitability of farming in the UK hardly allows for major investment or changes to the farming system to address energy use and emissions except where financial savings can be made, or grant support is available. However, through a piecemeal approach, it is possible to introduce new techniques which can make a substantial difference.

The main opportunities to reduce energy use and emissions on the farm are listed in Table 2.

The meeting considered some opportunities for Commonwork with its 260 dairy cows, 100 ha of arable and small flock of sheep to introduce more energy efficient and lower emission practises. Commonwork has a long history in energy generation having established one of the first methane digesters in the 1970s, though recently decommissioned due to repair costs and low gas production.

For any one interested in further information on climate change there is a very useful website; www.grida.no/climate/ipcc_tar/wg1/005.htm

Mark Measures mark.ecom@btinternet.com
Head of Organic Systems Development Programme
EFRC

Farming system	o Increased Diversity – arable and livestock o Appropriate Rotations and use of bi-cropping and intercropping o Potential for dedicated pasture and arable sections of the farm – a concept which has yet to be analysed o Intensity – more intensive production e.g. growing high output vegetable crops or managing cows for higher yields may be more efficient o Close the system to maximise recycling
Community	o Minimise food miles; processing (e.g. abattoirs) and distribution system o Community supported agriculture and local box schemes o Urban/ rural links
Manure and organic wastes	o Biogas production o Storage to minimise emissions form slurry e.g. cover lagoons o Spreading during spring and summer, avoiding very dry weather o Incorporation of manure in the soil o Light applications of manure o Use of sewage in agriculture (not acceptable to organic standards)
Other Farming practises	o Avoid ploughing permanent pasture and felling/burning woodland o Forage management – greater reliance on grazing, substitute silage with hay, use of "fogage" o Larger dairy herd size and cow yield (up to a point) o Ruminant nutrition including use of supplements to reduce methane emission o Co-operation between farms to share machinery and co-operate on cropping and manuring. o Selection of efficient crop types and varieties o Shallow ploughing o Reduced Nitrogen input – match input to crop demand o Use of cover crops
Machinery	o Match tractor to equipment o Tyre pressure o Min till (limited organic opportunity in UK at present) o Maintenance and operation o Possible potential to replace some mechanisation with hand labour and horses
Processing	Minimise waste through production methods and sensible grading standards

Energy production	o Biomass – particularly for heating e.g. dairy water, housing,
	  o Use existing woodland and hedges
	  o Potential for development of agro forestry
	  o Biomass crops e.g. miscanthus (beware of significant
	  o removal of land away from food production)
	o Bio fuels (beware of crops with poor energy efficiency characteristics)
	o Wind
	o Water
	o Solar – direct and photo voltaic water heating
	o Ground heat pump

Table 2. Reducing Energy and Emissions in Food and Farming - some solutions

Joanne Bower

Joanne Bower, who for 36 years was the honorary secretary of the Farm and Food Society (FAFS), has died at the age of 93. Inspired by Ruth Harrison's book *Animal Machines* (1964) Joanne became one of the first campaigners for farm animal welfare. She abhorred the stress and suffering inherent in intensive production and in 1966 helped to establish FAFS in order to oppose it.

At the time few people knew about conditions on factory farms. The government had set up the Brambell Committee to look into the problems, but it needed a campaign to counter the intensive lobby. When the committee's report came to be discussed in Parliament Joanne organised a demonstration and smuggled a cage of stuffed hens into the House of Commons. The MP John Ellis used this to great effect during the debate.

Everyone who knew Joanne admired her selfless determination to improve the lot of farm animals. She felt particularly for overcrowded chickens, pigs kept on concrete and dairy cows forced to give more milk than their bodies could stand. During the 1980s she played an important role in helping to shape the welfare sections of organic standards, lending support to both the Soil Association and EFRC.

Joanne knew it would take time to bring meaningful change. Her great strength lay in the conviction that detailed research and perseverance would eventually win through. For more than three decades she produced exposés and carefully argued papers showing there were better ways to keep animals and produce food.

Peter Singer, who became one of FAFS's patrons, drew extensively on her research in writing his highly influential *Animal Liberation* (1975).

A longstanding advocate for an ethical dimension to agricultural policy-making, Joanne was also the driving force behind the creation of the Food Ethics Council.

All of those who worked with her at EFRC are very sorry to hear the sad news. EFRC was the beneficiary of the FAFS resources and feels honoured to be trusted with that heritage - and we will do our best to live up to and carry on Joanna's example. *Richard Young*

Research & Development Programme Events 2006

EFRC01: Marketing with Organic Grain links - 21st June 2006
EFRC02: Marketing with Organic Arable Marketing Group - 27th June 2006
EFRC03: From Drought to Deluge? An Introduction to Integrated Water Resource Management - 11th July 2006
EFRC04: Organic Farm Management Practices as a Tool for Delivering Environmental Goods and Services - 1st August 2006
EFRC05: Organic Poultry: Is it for you?
EFRC06: Feeding 100% Organic Rations

EFRC 2006 Events - Booking Procedure

Payment can be made by cheque to: Progressive Farming Trust Ltd or by credit / debit card. All the events have a limited number of places available in order to ensure participation and relevance for all attendees; therefore places are booked on a "first come, first served" basis - book early to avoid disappointment!

To book your place on one or more EFRC 2006 Event, for further details or a programme contact EFRC's Education/Training Department on 01488 658298

You can book and pay for events by telephone using a credit / debit card

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