

Food Climate Research Network



Mailing to Members : 21 June 2010

1. Very interesting new paper on beef systems

Pelletier N, Pirog R, Rasmussen R (2010). Comparative life cycle environmental impacts of three beef production strategies in the Upper Midwestern United States, *Agricultural Systems* 103 (2010) 380–389

This is a fascinating paper. It compares three US beef rearing systems. Cattle are finished either in a. feedlot systems (having received hormone implants), b. backgrounding systems (also with hormone implants) or c. on pasture (no implants). NB: the paper describes briefly what backgrounding is but for another explanation see here:

http://agalternatives.aers.psu.edu/Publications/beef_backgrounding.pdf. In each case the cow-calf stage was the same (ie. all calves that went on to become beef animals were born and reared, to the point of weaning, in the same way).

The study compares the following:

- a. GHG emissions per herd and unit of beef produced
- b. ecological footprint/land take (this is weighted so arable scores differently from pasture land)
- c. industrial energy in (ie. fossil fuels) vs edible energy out (meat)
- d. chemical energy in (biomass energy for consumption) vs edible energy out (meat)
- e. edible energy in (grains etc) vs edible energy out (meat)

It finds on a per kg meat basis that feedlot cattle score best in terms of:

- a. GHG emissions per herd and unit of beef produced
- b. ecological footprint/land take (this is weighted so arable scores differently from pasture land)
- c. industrial energy in (ie. fossil fuels) vs edible energy out (meat)
- d. chemical energy in (biomass energy for consumption) vs edible energy out (meat)

but worst on the edible energy in vs edible energy out indicator.

Pasture finished animals do worst, except on the edible energy in vs edible energy out when they do much better.

The paper assumed no carbon sequestration occurred in pasture-fed systems. However, it also carried out a sensitivity analysis and when it applied estimates of 0.12 tonnes C sequestered/ha/year for improved cow-calf pastures and 0.4 tonnes C sequestered/ha/year for previously unmanaged pastures subjected to management-intensive grazing for pasture finishing, it found that pasture raised beef have 15% lower emissions than the feedlot beef and better than the backgrounded ones too. In other words, assumptions about sequestration are key. Of course, as the paper notes, as soil carbon equilibrium is reached the benefits tail off.

In terms of industrial (ie. fossil energy) in vs fossil energy out, the paper points out that the pasture receives applications of fertiliser and is managed with use of tractors and so forth. It points out that 'beef produced on unmanaged rangeland may, indeed, be considerably less energyintensive than the systems we modelled, although this would also result in tradeoffs in terms of animal performance and associated emissions.

In terms of chemical energy in, it took me a while to understand this, but this is the description in the paper: 'Since the chemical energy content of biological materials represents a crude but reasonable proxy for the limited net primary productivity underpinning almost every trophic web, gross energy return on investment provides a reasonable first-order approximation of the ecological efficiency with which our food systems supply food energy relative to the demands they place on ecological communities'. I think what the paper is comparing is essentially caloric energy from grains as opposed to those from byproducts. For a given byproduct emissions generated during the course of producing a product are allocated on the basis of the respective caloric energy content of the co-product streams. So for instance in the case of citrus if the orange flesh contains 50 calories and the pith/peel 10 (I'm guessing here), and the pulp goes to animal feed, then one sixth of the emissions generated during the course of producing that orange is allocated to the pith/peel and hence to the animal. Since grains are more digestible than byproducts (and so less feed input is wasted in the form of methane), it does in fact stand to reason that it is more efficient to feed them these than byproducts. And I suppose if it is inefficiently consumed by beef cattle there is relatively less available for other life forms.

Of course, one might ask what else you would do with these byproducts if you didn't feed them to animals (anaerobic digestion is one answer). You could also say that the pith and peel of an orange is not the driver of citrus production – the flesh is. But, as Nathan correctly points out, these are value judgements and the point here was to look at physical flows of materials and energy.

On ecological footprinting/land take the study says: Although the footprint method weights pasture and cropland differently (because pasture provides a greater range of ecosystem services than does cultivated cropland), the large areas required ultimately contribute to a larger ecological footprint for grass-finished versus feedlot-finished beef. Note that the ecological footprint includes not just the area used for the livestock but also the area needed to offset the emissions they produce.

Very importantly the paper shows that the cow–calf phase is the greater contributor to resource use and emissions in beef production. Averaged across impact categories, the cow–calf phase is responsible for approximately 63% of impacts per live-weight kg of beef produced in all three of the finishing scenarios. As the paper points out (and as others have too) this rearing of specialised beef animals and dairy mothers is very wasteful since the beef mother hangs around producing emissions and doing nothing else except producing a calf once a year. The dairy cow on the other hand, produces lots of milk but the male calves aren't that good for beef and are often shot at birth (Beckett sums this one up <http://www.brainyquote.com/quotes/quotes/s/samuelbeck391440.html>). Dual breeds, when the mother also produces milk, means you get the impacts shared between the dairy and the beef sectors.

It would be interesting to do the study in a UK context, where hormone use is not permitted. You might get the gap between feedlot and pasture systems narrowing.

Finally, the paper concludes with the following points, and I quote: "We would also stress that none of the systems analyzed can be described as ecologically efficient relative to most other food production strategies. Certainly, our measures of resource returns on investment provide strong indications to the contrary. Moreover, our work does not provide insights into the social and economic dimensions of these activities. For example, we do not consider costs and benefits related to variables like job creation or quality of life, nor do we address a spectrum of proximate ecological considerations, including biodiversity impacts, or concerns such as animal welfare. Our results should therefore not be taken as stand-alone metrics of the sustainability of feedlot versus pasture-finished beef production in the US Upper Midwest. Rather, they are intended to contribute to our necessarily evolving and increasingly nuanced understanding of beef production and food system sustainability issues generally, and offer insights into how the beef production systems considered here might best pursue improved environmental performance."

Two of the authors – Nathan Pelletier and Richard Pirog, are FCRN mailing list members. If either of you two would like to add anything to or correct my summary, please do and I'll circulate in a future mailing.

2. Another v. interesting paper: Agriculture, the green revolution and its role in emissions avoidance

Burney J A, Davis S J and Lobell D B (2010). Greenhouse gas mitigation by agricultural Intensification, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.0914216107

This paper estimates the net net effect on GHG emissions of historical agricultural intensification between 1961 and 2005. It finds that missions from factors such as fertilizer production and application have increased, the net effect of higher yields has avoided emissions of up to 161 gigatons of carbon (GtC) (590 GtCO₂e) since 1961. It also estimates that each dollar invested in agricultural yields has resulted in 68 fewer kgC (249 kgCO₂e) emissions relative to 1961 technology (\$14.74/tC, or ~\$4/tCO₂e), avoiding 3.6 GtC (13.1 GtCO₂e) per year.

In order to calculate 'avoided' emissions, the paper describes two hypothetical alternative scenarios, AW1 and AW2.

In AW1, it looks at what would happen if the green revolution hadn't happened BUT that population growth and current patterns and levels of consumption are what they are today.

In AW2, it attempts to answer the challenge that the green revolution has in fact made current patterns of consumption possible. It therefore keeps per capita consumption patterns (including per capita intakes of meat and dairy) at 1961 levels, but assumes pop growth to today's levels. Population projections derived from pre-1961 fertility and mortality rates are used which coincidentally result in very similar 2000 populations, albeit with different age structures

In each of the three scenarios the calculations include N₂O from agricultural soils; CH₄ from rice cultivation; C released from both biomass and soil by conversion of forest, shrub, and grassland to cropland; and N₂O, CH₄, and CO₂ from the production and use of nitrogenous, phosphate, and potash fertilizers.

As you can see from the copied figures, in scenario AW2 as well as in AW1, emissions are still higher than they really are today.

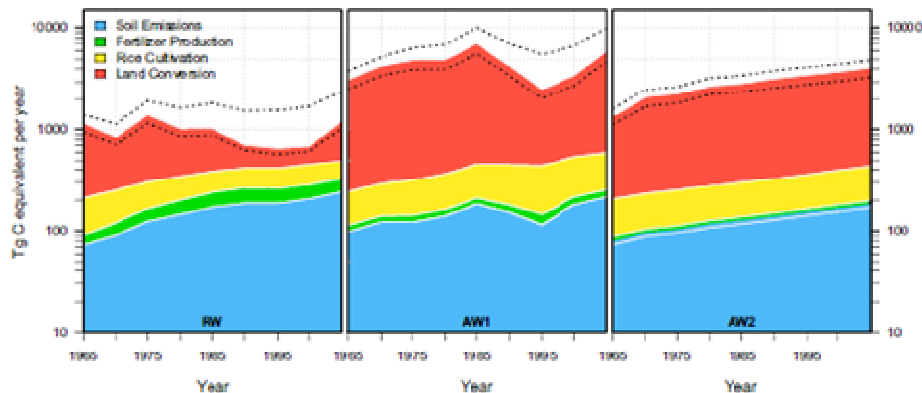


Fig. 2. Comparison of trends in the RW and AW scenarios between 1961 and 2005. (Upper) Agricultural yield weighted by production, cropland area, fertilizer consumption, and population. (Lower) Annual GHG emissions broken down by source (see Method). The land use change values, plotted in green, assume the same pattern of expansion by biome in the RW and AW scenarios, corresponding to a global average of 105 ± 26 tC/ha lost, including both biomass and soil organic carbon losses.

(nb: the dotted white lines indicate a +/-20% uncertainty in the carbon content of biomes)

The paper notes that "The AW scenarios presented above do not attempt to dynamically describe what might have occurred in the absence of yield improvements; rather, they demonstrate the range of possibilities by calculating, on the one hand, the area required to support modern global living

standards with 1961 yields (AW1) and, on the other hand, the area required to maintain 1961 living standards (with 1961 yields through 2005 (AW2).”

It also says: In the AW1 scenario, this study demonstrates the incredible environmental cost modern living standards would have exacted without yield improvements (or unprecedented humanitarian crises). Although the GHG impacts of yield improvements in the RW are lower compared with the AW2 scenario, the deepest troubles in a world like AW2 would have appeared mainly after 2000 and thus are somewhat masked in this analysis. The population projections in the AW2 scenario (1950–1955 mortality and fertility rates projected forward) result, coincidentally, in population totals similar to the RW in 2000 (24). Thus, the constant per capita production in AW2 would result in less dramatic land expansion than in AW1. However, population in AW2 would strongly diverge from the RW population after 2000, resulting in a much greater future GHG impact without gains in yield NB: this is because of the age structure in AW2 – the population is on average younger and so future population growth will be greater.

I'm copying the conclusions as follows:

Our results demonstrate the importance of land use change emissions over direct emissions of methane and nitrous oxide from agricultural systems, and suggest that the climatic impacts of historical agricultural intensification were preferable to those of a system with lower inputs that instead expanded cropland to meet global demand for food [my emphasis]. Enhancing crop yields is not incompatible with a reduction of agricultural inputs in many circumstances, however. To the contrary, careful and efficient management of nutrients and water by precision farming, incorporation of crop residues, and less intensive tillage are critical practices in pursuit of sustainable and increased agricultural output. Furthermore, it has been shown in several contexts that yield gains alone do not necessarily preclude expansion of cropland, suggesting that intensification must be coupled with conservation and development efforts. Nonetheless, for mitigating agriculture's future contributions to climate change, continuing improvement of crop yields is paramount. The global population is expected to reach 8.9 billion by 2050, with food demand expected to rise by 70%. Even if yield gains over the next four decades are smaller than those of the previous four decades, the potential to avoid future emissions may be larger and more cost-effective than the 161 GtC of emissions avoided thus far, given that current cropland expansion often occurs in tropical forests and that the remaining forests are carbon-rich relative to many cleared forests. Improvement of crop yields should therefore be prominent among a portfolio of strategies to reduce global greenhouse gas emissions; in order to speed the adoption of agronomic advancements that improve crop yield, mechanisms for connecting investments in yield gains to the global carbon markets should be explored.

Note that the paper does not mention shifts in patterns of consumption although presumably it is implied in the statement quoted above that 'this study demonstrates the incredible environmental cost modern living standards would have exacted without yield improvements.' The study I think reveals (although doesn't explicitly mention this) the important contribution that the sheer growth in the number of people have made to the increase in agricultural emissions.

It is of course possible to envisage various other scenarios – ie. what if the global agricultural community invested research in the 1960s into sustainable yet intensive agriculture – what results would we have then? But in a sense this is being wise after the event, because arguably it was only as a result of the environmental consequences of the green revolution that we realised we needed to do things differently... maybe others will not agree.

The paper is open access and can be downloaded here:

<http://www.pnas.org/content/early/2010/06/14/0914216107.abstract?sid=972f1aed-58db-41c4-8b61-49afd4a99373> . Steven Davis, one of the authors, is also an FCRN mailing list member.

Comments welcomed and please let me know if you'd like me to forward any to Steve.

3. And a third: consumption patterns and projected growth in agricultural GHG emissions

This one in a sense takes off where the other left off...

Popp A, Lotze-Campen H and Bodirsky B (2010). Food consumption, diet shifts and associated non-CO₂ greenhouse gases from agricultural production, *Global Environmental Change* 20 451–462

Today, the agricultural sector accounts for approximately 15% of total global anthropogenic emissions, mainly methane and nitrous oxide. Projecting the future development of agricultural non-CO₂ greenhouse gas (GHG) emissions is important to assess their impacts on the climate system but poses many problems as future demand of agricultural products is highly uncertain. We developed a global land use model (MAgPIE) that is suited to assess future anthropogenic agricultural non-CO₂ GHG emissions from various agricultural activities by combining socio-economic information on population, income, food demand, and production costs with spatially explicit environmental data on potential crop yields. In this article we describe how agricultural non-CO₂ GHG emissions are implemented within MAgPIE and compare our simulation results with other studies. Furthermore, we apply the model up to 2055 to assess the impact of future changes in food consumption and diet shifts, but also of technological mitigation options on agricultural non-CO₂ GHG emissions.

As a result, we found that global agricultural non-CO₂ emissions increase significantly until 2055 if food energy consumption and diet preferences remain constant at the level of 1995. Non-CO₂ GHG emissions will rise even more if increasing food energy consumption and changing dietary preferences towards higher value foods, like meat and milk, with increasing income are taken into account. In contrast, under a scenario of reduced meat consumption, non-CO₂ GHG emissions would decrease even compared to 1995. Technological mitigation options in the agricultural sector have also the capability of decreasing non-CO₂ GHG emissions significantly. However, these technological mitigation options are not as effective as changes in food consumption. Highest reduction potentials will be achieved by a combination of both approaches.

In more detail:

The authors consider 3 scenarios:

In the baseline scenario In the 'baseline scenario' regional trade balances, food energy demand and the share of livestock products in total caloric intake are kept constant at 1995 levels.

In the 'increased meat scenario' the link between GDP and food energy demand as well as the share of livestock products in total caloric intake are given by a regression equation (which is presented in a figure in the paper)

in the decreased meat scenario' food energy increases with increasing GDP comparable to the 'Increased meat scenario' but the share of livestock products in total caloric intake is reduced in each time step, starting in 2005, by 25% compared to the previous time step.

The authors also developed the following additional 2 scenarios:

- Increased meat scenario + technical mitigation' and
- Decreased meat scenario + technical mitigation') that consider technological mitigation options for all agricultural activities.

Regionally specific emission reduction factors are based on a study which the authors cite that investigates agricultural non-CO₂ reduction potential at different carbon prices. A carbon price of up to \$ 1000 was used.

The study finds that:

- In the baseline scenario non CO₂ emissions rise from 5314 CO₂-e in 1995 to 8690 CO₂-e in 2055.
- In the increased meat scenario' non CO₂ GHGs rise by 76% by 2050 compared with the baseline scenario.

- In the decreased meat scenario emissions drop by 51% compared to the baseline model.
- In the Increased meat scenario + technical mitigation, technological mitigation options in the agricultural sector decrease global agricultural non-CO2 emissions by 36% in 2055, compared to the 'increased meat scenario', but still increase emissions by 13%, compared to the 'baseline scenario'.
- Lowest non-CO2 emissions can be found in the 'decreased meat scenario + technical mitigation' where reduced demand for meat products combined with mitigation options in the agricultural sector will lead to global agricultural non-CO2 emissions of 2519 CO2-e in 2055 – ie. an approximate halving of 1995 emissions.

You can read the abstract and (if you have a subscription) download the paper here:

[http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V-FV-4YR49V6-1&_user=10&_coverDate=08%2F31%2F2010&_rdoc=13&_fmt=high&_orig=browse&_srch=doc-info\(%23toc%236020%232010%23999799996%232154746%23FLA%23display%23Volume\)&_cdi=6020&_sort=d&_docanchor=&_ct=22&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&_m-d5=4ec549381b8c6684ac61d33d85c91361](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V-FV-4YR49V6-1&_user=10&_coverDate=08%2F31%2F2010&_rdoc=13&_fmt=high&_orig=browse&_srch=doc-info(%23toc%236020%232010%23999799996%232154746%23FLA%23display%23Volume)&_cdi=6020&_sort=d&_docanchor=&_ct=22&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&_m-d5=4ec549381b8c6684ac61d33d85c91361)

4. New biodiversity 'IPCC' established

A new Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) has been set up. The independent platform will in many ways mirror the Intergovernmental Panel on Climate Change (IPCC) and its work will include carrying out high quality peer reviews of the wealth of science on biodiversity and ecosystem services emerging from research institutes across the globe in order to provide 'gold standard' reports to governments.

For more information see here: <http://ipbes.net/>

5. Use of incentives to change public behaviour: call for information

The Institute for Government is studying the use of incentives by public authorities to change people's behaviour. Potential areas for such interventions are to improve health, educational outcomes, reduce crime, change environmental behaviours and so on. The Institute is interested in finding out the range of incentives you have used, their purpose and your judgement of their effectiveness (and would particularly like to hear about any formal evaluations or reports). They are also looking at the impact of focussing on "wellbeing" as an outcome of government action, alongside more conventional measures. They would be keen to know in what ways your organisation has gone about looking at subjective wellbeing - that is, self-reports of satisfaction with life or domains of life (health, local area etc) and assessments of happiness or mood and how it has influenced the policy choices you have made. Again, any more formal evaluations of the impacts would particularly be of interest. Responses would be very much appreciated, and may be sent to Zoe Harris zoe_harris@berkeley.edu by 25th June.

6. Westminster Energy, Transport and Environment Forum seminar: Engaging the public on climate change

18th November 2010: Central London.

As doubts persist about the causes and future impact of climate change, this seminar will explore how government and the scientific community can foster better engagement with the public on issues

around climate change. Timed to coincide with the build up to the next key United Nations climate change summit in Mexico, the seminar will also examine what is likely to be achieved at this set of discussions - particularly with reference to the global public perception of climate change. Including a keynote presentation from the European Commission, planned sessions will focus on: identifying the strategies required to effectively engage the public with climate change; prospects for fostering climate change consensus; expectations for Mexico and the consequences for climate change policy development and implementation; latest ideas on social marketing and incentivising behavior; the view from the European Commission; and, the UK climate change position - outlook and next steps for policy.

Speakers include: Pierre Dechamps, Adviser on Energy and Climate Change to the European Commission, Michael Norton from Halcrow and Vicky Pope, Head of Climate Change Advice, Met Office.

7. Job available: Professor of Food and Society, Newcastle University

Ref: G464, closing date for applications 5 July 2010

Newcastle University is continuing its investment in the Centre for Rural Economy (CRE) <http://www.ncl.ac.uk/cre/> and the School of Agriculture, Food and Rural Development <http://www.ncl.ac.uk/afrd/> to enhance its teaching, research and engagement expertise in the social science of food and society. The new Chair will play a strategic leadership role in developing research and teaching and will provide academic leadership of the Food Systems, Consumption and Marketing subject group, one of three such subject groups within the Centre. Informal enquiries concerning this position and the Centre can be made to the Director, Guy Garrod email Guy.Garrod@ncl.ac.uk +44 191 222 7552. For more information about the job see here: http://www15.i-grasp.com/fe/tpl_newcastle02.asp?s=lrTqWByLiAMrOoAjg&jobid=35335.6554565402&key=7850683&c=352521233498&pagestamp=sepnppddnihatwtbjfx

8. OECD-FAO Agricultural Outlook 2010-19 published

The OECD and FAO have published their latest joint Outlook report.

Key points as follows:

- The macroeconomic environment underlying the commodity projections is more positive than in the 2009 Outlook.
- Underpinning agricultural prices is increasingly a higher cost structure particularly in regions where energy inputs are used intensively. Global agricultural production is anticipated to grow more slowly in the next decade than in the past one, but in the absence of unexpected shocks, growth remains on track with estimated longer term requirements of a 70% increase in global food production by 2050. On a per capita basis, production growth in least developed countries is struggling to keep up with rapid population growth. Global sectoral growth will be led by the regions of Latin America and Eastern Europe and, to a lesser extent, by certain countries in Asia. Average crop prices over the next ten years for the commodities covered in this Outlook are projected to be above the levels of the decade prior to the 2007/08 peaks, in both nominal and real terms
- For livestock products, average meat prices in real terms, other than for pigmeat, are expected to surpass the 1997-2006 average over the coming decade initially due to lower supplies, higher feed costs and rising demand. Pigmeat real prices should stay relatively

subdued due to an anticipated increase in supply from Brazil and China. Economic recovery will strengthen consumption of meats relative to cereals, particularly in developing countries, with most growth favouring cheaper meat - poultry and pigmeat - relative to beef. Average dairy prices in real terms are expected to be 16-45% higher in 2010-19 relative to 1997-2006, with butter prices showing most gains, supported by higher energy and vegetable oil prices.

- Biofuel markets depend heavily on government incentives and mandates, but prospects remain uncertain, due to unpredictable factors such as the future trend in crude oil prices, changes in policy interventions and developments in second-generation technologies.
- Developing countries will provide the main source of growth for world agricultural production, consumption and trade. Demand from developing countries is driven by rising per capita incomes and urbanisation, reinforced by population growth, which remains nearly twice that of the OECD area. As incomes rise, diets are expected to slowly diversify away from staple foods towards increased meats and processed foods that will favour livestock and dairy products. Also, with increasing affluence and an expanding middle class, food consumption in these countries should become less responsive to price and income changes, as is currently the case in OECD countries. This implies that larger changes in price and incomes will be required for consumption to adjust to any unforeseen shocks.
- For virtually all commodities the projected growth in imports and exports of developing countries exceeds that of the OECD area. Only exports of processed protein meals increase faster in the OECD area by 2019. The higher share of developing countries in trade is reflected in expanding South-South trade in addition to North-South trade.
- Since the price spike of 2006-08, short term price volatility has increased considerably. However, the evidence is inconclusive as to whether and how price volatility has changed over the long term for the major food crops examined.
- The Outlook's relatively stable price projections result from the assumption of "normal" conditions. Uncertainties around weather, macroeconomic factors, policy interventions, and especially energy prices suggest that commodity prices will remain unpredictable.
- Governments can underpin farmers' risk management strategies by focusing on those unpredictable and unavoidable risks that may be rare, but have large consequences, and which farmers cannot manage themselves. Governments can also empower farmers to manage their own business risk.
- National and local emergency stockholding of key food security commodities, for food emergencies, particularly for low-income food importing countries, may increase confidence in the access to food in times of crisis and help stabilise local markets.
- Market price support for agricultural commodities is a policy option that has clearly shown in many countries and over several decades to be inefficient and its use has declined. Price support masks market signals to producers, destabilises world markets and acts as a regressive tax on the poor by raising prices to consumers. Price support also skews support towards large producers and, encourages intensification with potentially adverse effects on the environment. Such measures should be assessed against other less distorting alternatives, such as targeted direct income supports, investments in productivity enhancements, etc.

You can download the highlights (88pages), press release and various other things here: http://www.agri-outlook.org/pages/0,2987,en_36774715_36775671_1_1_1_1_1,00.html

The BBC summary is also helpful: <http://news.bbc.co.uk/1/hi/business/10320149.stm>

9. High ground, high potential – a future for England's upland communities, Commission for Rural Communities, 2010

The Commission for Rural Communities has published a new report. It argues that the English uplands are landscapes that provide a wealth of natural and cultural assets and have potential to generate many valuable public goods and market products, supporting a low carbon future and green economy. Unlocking that potential requires government to work with and support local communities and land managers. In particular this means empowering communities, increasing the supply of

affordable housing, particularly for young people, and improving access to next generation broadband and mobile communications. Current support for hill farming is inadequate to sustain these assets. New funding mechanisms are required as part of the reform of the Common Agricultural Policy from 2013. These would reward farmers for managing national assets in harmony with developing businesses. A new approach is needed which would balance the needs of the environment with maximising the economic potential of the uplands. But supporting farmers is not sufficient on its own: the communities in which they are embedded must also be enabled to thrive if these assets are to be sustained.

Key recommendations as follows:

- Government should develop a comprehensive and integrated strategy for England's uplands
- The Government should appoint an individual with lead responsibility for implementing the strategy. This individual should be accountable to Ministers of BIS, CLG, DECC and Defra.
- Current funding mechanisms will not unlock the potential of the uplands and as part of the CAP reform in 2013 and 2020, Defra and its agencies (and the EU) should develop a new approach to rewarding farmers for managing national assets in harmony with developing businesses and market enterprises.
- Defra should establish a long term land management policy to mitigate carbon loss, particularly in relation to peatlands management.
- DECC and CLG should require local authorities to complete an audit of the opportunities for renewable energy.

You can download the report and the press release here:

<http://ruralcommunities.gov.uk/2010/06/15/upland-communities-2/>

10. New report on value of virtual conferencing etc

Not food related but one of my particular hobby horses is the amount of travel that goes on in the name of 'saving the planet'. Does anyone feel like doing the sums on 'environmental impact of climate change conferences'? Maybe even set it against 'emissions avoided due to alpha brains gathering together to think deep thoughts' in order to do a proper environmental cost benefit analysis. Maybe a subject for a masters dsstn?

Anyway: the Carbon Disclosure Project has published a new report entitled *The Telepresence Revolution*

<https://www.cdproject.net/telepresence-revolution>. Key findings are:

- An individual business implementing four telepresence rooms can reduce its CO2 emissions by 2,271 tonnes over five years. These reductions are equivalent to the annual GHG emissions from over 400 passenger vehicles.
- From an economy-wide standpoint, US and UK businesses with annual revenues of more than \$1 billion can cut nearly 5.5 million metric tonnes of CO2 emissions by 2020 as a result of deploying a total of almost 10,000 telepresence units. These reductions are equivalent to the annual greenhouse gas emissions from over one million passenger vehicles. NB: for comparison the UK's total GHG emissions are
- US firms can reduce CO2 by 112,000 metric tons in 2010 to 963,000 metric tons in 2020, a total of almost 4.6 million metric tons in cumulative cuts in CO2. These reductions are
- equivalent to the annual greenhouse gas emissions from almost 880,000 passenger vehicles.

NB: as a baseline comparison for these figures, the UK's total national GHG emissions are currently about 575 mill tonnes CO₂ eq. So the saving for the US and UK combined is equivalent to about a 1% cut in UK emissions. Not huge but worth doing in view of the need to tackle growth trends as much as the snapshot situation today.

11. Member information request: hydroponic vs organic produce

This comes from mailing list member Debbie Ellen:

Does anyone know of any work on the comparative carbon footprint of hydroponics and organic production? My understanding of hydroponics is that a variety of inputs (e.g. nutrient solutions) are needed to get the plants to grow - but what I don't know is what the comparative carbon footprint of these inputs is compared to organic production of fruit and vegetables and its inputs.

If anyone knows of any studies that have looked at this (or are looking at it) I'd be very grateful if you could let me know. You can contact me directly via debbie.ellen@gmail.com

NB: I've pointed here in the direction of the Cranfield 2006 report which compares conventional (ie hydroponically grown) tomatoes with organic ones)

<http://www.fcrn.org.uk/researchLib/researchlib.php?id=2#4> 1314
