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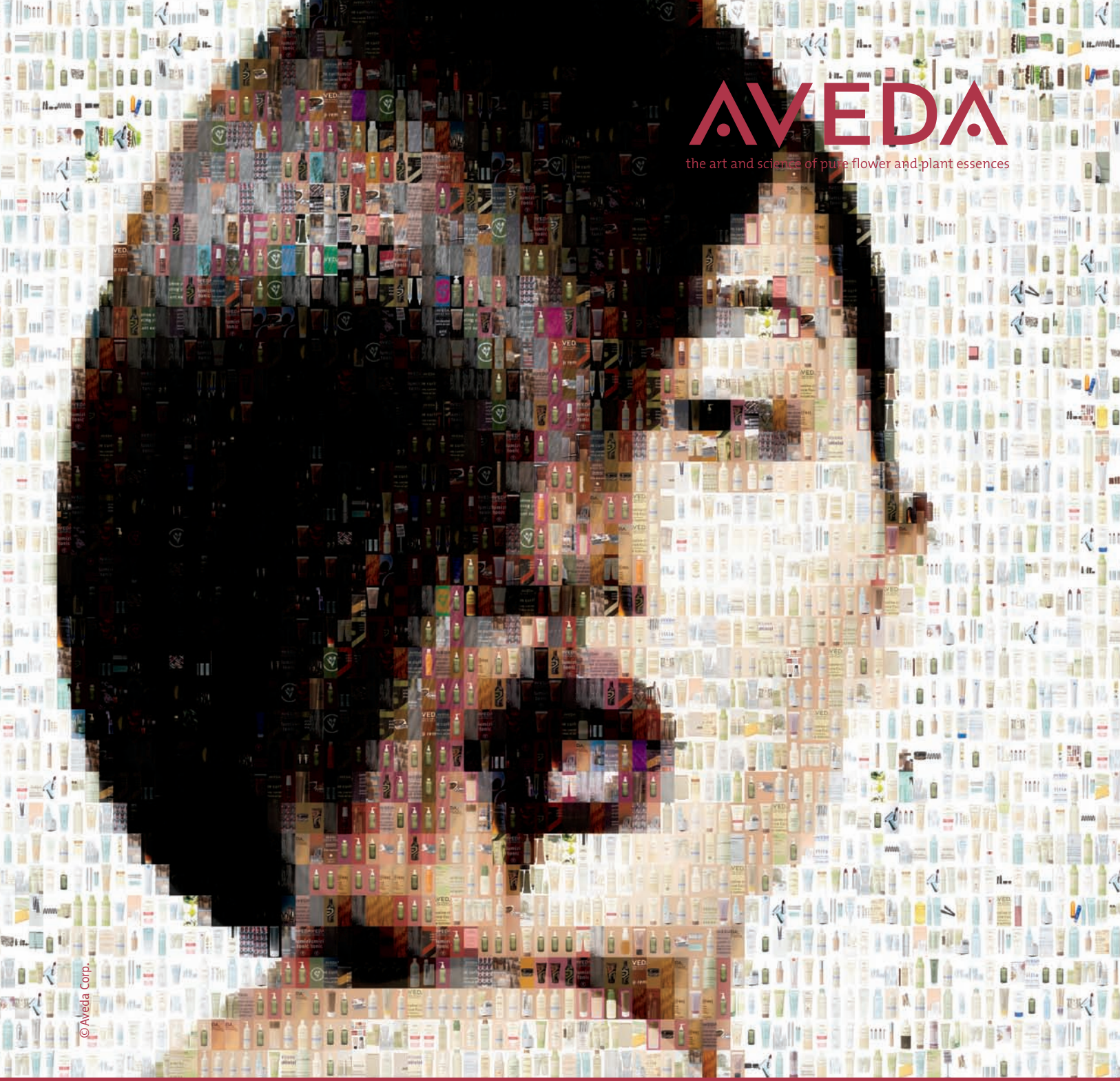

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March 2008

Volume 38, Issue 2

FEATURES

20 **Listening to the Earth**
Nicola Graydon meets Chief Sonne Reyna, a man with an intimate understanding of ecology, ecumenical religion and enchiladas

22 **Bestia non grata?**
Reintroducing a species to the wild is usually a cause for celebration. So how did a handful of bears released in a French forest become objects of hate? **Nick Kettles** reports

26 **The other campaign trail**
Tired of biting your nails as you watch Hillary and Barrack battle it out? Find out who's doing the grassroots campaigning this side of the pond. **Alex Thursby, Nick Wilsdon** and **Russell Scott** investigate

31 COVER **The death of food as we know it**
An entire culture of cheap, mass-produced food is about to be brought to a grinding halt. We ask, what will take its place? • 32 There's reason to worry about the security of our food supplies, says **Tim Lang** • 35 **Chris Milton** asks where Whole Foods went wrong 37 **Graham Harvey** tugs the fig leaf from the private life of soil • 41 If you think more CO_2 in the air means more food for green plants, think again, says **Pat Thomas** • 43 Can organics feed the world? **Ed Hamer** and **Mark Anslow** offer a definitive answer and dash all hopes for GM • 49 Buying local doesn't mean robbing the developing world, argues **Vandana Shiva** • 50 **Joanna Blythman** lays the table for tomorrow's dinner plates

COMMENTS

14 Far from being a liberal notion, encouraging the global South to achieve industrialisation is just what big business wants, says **Helena Norberg-Hodge** • **Joss Garman** begins his new column, pointing a finger at the lunacy of coal • **Jeremy Leggett** exposes the twisted logic behind the Government's nuclear decision and renewables programme • No matter what technology you choose, says **Richard Heinberg**, living in a resource-scarce future will mean a radical culture change


P 22


P 31


P 20


P 58

REGULARS

6 **Letters**
A regular forum for readers' views

8 **News**
Nuclear proliferation; pushing junk food on children; the dawn of a new epoch; backyard hen-keeping; formula milk worries

12 **News focus**
Recycling is *so* 20th-century. **Mark Anslow** meets the 'remanufacturers'

18 **Behind the label: Lucozade sport with caffeine boost**
You may be paying an unhealthy price for that extra boost in the gym, says **Pat Thomas**

88 **Reviews**
Water: Life in Every Drop; In Defence of Real Food; The War on Democracy; The Rough Guide to Climate Change; Last Words

90 **How to be free**
Forget eradicating poverty, says **Tom Hodgkinson** – let's try making wealth history

GREEN PAGES

56 **In season**
Visit a city farm, cook with sorrel and witness a total eclipse of the moon. **Laura Sevier** has some suggestions for March

58 **Eco fashion: style and substance**
Slow clothes, reclaimed fabrics, organic products, ethical trade. It's all here, **Matilda Lee** discovers, and it's looking good

64 **Estethica eco designers**
A showcase of the pioneers marrying cutting-edge design with an ethical stance

66 **The poetry of compost**
Paul Kingsnorth waxes lyrical over the wonders of the black stuff

68 **Water wisdom**
Laura Sevier gets water-wise with the world's most precious resource

70 **Local hero: Michael Goetze**
Laura Sevier meets the baker whose 'slow' loaves go against the industrial grain

Take family all the rest

unproductive play gaps

friends out of life your day

Image: CORBIS

Editorial
Going for the green

A new green tide is sweeping over us. Thanks to January's presidential debates in the US, politicians everywhere are meeting the grey news of a collapsing economy with the promise of a bright new era of green jobs.

I should be jumping for joy that this issue has been placed on the political agenda, and part of me truly is, because it's a discussion whose time has come. Yet this green flag waving left me more than a little conflicted, primarily because of the lack of depth with which the candidates have gone into the concept of green-collar jobs. 'Green-collar job' has entered the modern lexicon before its true meaning has been assessed, and the superficiality of the debate raises many more questions than it answers.

The premise seems straightforward enough: there is a lot of green work to be done if we are going to save the planet, work that will translate into lots of green jobs. This, in turn, will increase employment and do good for the planet as well. Win-win.

A green-collar job is largely a blue-collar job – in the manufacturing or service industries – dyed a different colour. In the current market there are a lot of people already doing green-collar jobs. From public transport and bicycle repairs to landscape gardeners, cleaners, child-minders and people who produce and fit home insulation, 'green jobs' are all around us – though they don't seem to feature highly in the politicians' new green vision.

Perhaps in the new world there will be more of these kinds of jobs, but the notion that these will be on top of all the other jobs that exist is probably misleading. The 'plus' of any proposed new green jobs needs to be weighed against the 'minus' of planet-polluting jobs that won't be able to exist when the oil runs out – manufacturers of every kind of plastic tat, sweatshop labourers, 4X4 manufacturers and pesticide and chemical companies, to name but a few. Before we start celebrating these new green jobs, let's get some realistic estimates of the actual bottom line for employment.

Many progressive economists feel that a truly sustainable society won't be able to provide full employment, especially in a world where we juxtapose a population that is growing exponentially with a world that is rapidly running out of basic resources. That is a scary enough equation, but consider what a sustainable society really means. It is a world where we don't produce more than we need, or create more waste than the planet can absorb. It's one where there is less to buy and so fewer services required, and where we as individuals begin to take responsibility for so many of the skills (from repairing taps to baking bread to growing some of our own food) that modern society has dictated we farm out to others.

Then there is the real elephant in the room – growth. We can't separate the jobs we do from the economic system in which they exist. Our economic system depends on growth and, broadly speaking, growth depends on the continual consumption of goods and services. The green jobs our politicians are talking about are ones that seem to fit seamlessly into this system. But a truly green job has a fundamentally different basis, emphasis and function in the world to the ones we currently do. Solar panels, for instance, are not mobile phones. You don't install them and then six months later upgrade to newer, snazzier ones with prettier colours and more functions. Green manufacturing jobs are based on manufacturing goods with real longevity – thus the potential for growth is more limited. What happens to our economic system when growth is taken out of the equation?

Green jobs are also a threat to the concept of globalisation, since by their very nature they are local and small. The all-important economies of scale of the new green world have yet to be addressed fully.

So perhaps before we can talk about re-engineering green jobs we should get to grips with what that really means. It's a scary conversation and one that you are not likely to hear politicians on either side of the pond engaging in, especially when canvassing for votes. Nevertheless, the issue of what our economy is going to look like in 40 years' time is hugely important, vastly complicated and deeply related to the kinds of jobs we will be able to do in the future. It desperately needs to be dragged out on to a more comprehensive platform for discussion.

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Cover photograph Arthur Woodcroft
Concept and art direction Sam Franks

WELCOME TO THE WORLD ECO BABIES!!
Elena born to Matilda Lee and Alex Volcic
Leela born to Paul Kingsnorth and Nav Chhina
We are thrilled to have you both here...

Letters

Send letters for publication to:

Letters, the *Ecologist*, Unit D102, 116–118 Commercial Street, London E1 6NF.
Email: letters@theecologist.org.
The *Ecologist* reserves the right to edit letters as necessary.

STAYING EARTHED

I was a bit confused by Paul Kingsnorth's article (February), which included many personal opinions on the spiritual aspects of allotment gardening, and am curious to know what his true intention was in writing it. As for biodynamic farming, he fails to mention that it's not only about attaining spiritual knowledge (aside from creating a truly sustainable way to grow great produce without the use of bad chemicals), but also about healing our earth. It is something growers can do for the future of humanity and could have highly beneficial, far-reaching effects. I hope he reads that book on his shelf sooner rather than later, since he is lucky enough to have an allotment in the first place!

Giovanna Mabanta, by email

NEW WOOD IS A WASTE

Your article on steam-bending wood (February) highlighted the beauty and usefulness of wood, which I agree is a resource that we need to use more, especially in place of plastics and the like. It struck me as ironic, though, that the process described custom-making a steel mould for shaping each piece of furniture. If I knew the process behind the creation of my beautiful wooden chair I would rather do without and buy one from a second-hand place. Let's not get carried away by things that seem like the eco answer but really are not. The fact that no glue is needed pales into insignificance beside the comparatively huge consumption of metal and energy.

Sarah Stone, Coventry

WEATHER REPORT

Where has Michel Chossudovsky been hiding?

The 20th century saw rapid development of the use of weather modification, both deliberate and inadvertent, in warfare.

Take mean surface air temperatures from 1880 to 1980, before the start of the hockey stick curve. Put on the dates and duration of such events as WWI, the Depression, WWII and the period of worldwide industrial production loss, atomic atmospheric testing and noting the hydrogen bomb testing periods. Now look at the significant short-term temperature variations – we must have missed some major volcanic eruptions. The general cooling mid-century coincides with the long-term effects of WWII, with smoke and other pollutants of war lofted by solar heating up into the stratosphere, where they would reside for many years, not months.

In WWI, gas warfare was a form of weather modification, and weather modification was used during WWII by all sides. The Japanese delivered thousands of bombs to the West Coast of the US by balloons. The British modified weather on a small scale, while Eisenhower's personal weather adviser, Irving P. Crick, was a maverick whose experiments with cloud-seeding and hail-suppression continued into the postwar period.

The US Congress held Committee Hearings on Environmental Modification in Warfare in 1973 or so. Chossudovsky mixes the main reason for the cloud-seeding, which was to try and destroy irrigation dams in North Vietnam by bombing infrastructure to create massive flooding. The possible six-week extension of the rainy season was a bonus in that the military planners thought this would slow down movement on the Ho Chi Minh Trail. Defoliation followed, a much more effective climate-modification technique.

In winter 1975/1976, the Soviet Union bombarded the upper atmosphere with high-energy beams. Local ham radio operators worldwide complained of the interference created in the ionosphere. The flow of the jetstream was such that the north-eastern part of North America experienced several months of climatic chaos. The problem was so great that Edward Teller was quoted as saying 'Of course they [the Soviets] are doing it. We should get on with it too' – and this just a few years after his own underground atomic testing in the Aleutians.

Roger Thirnbeck, via email

Ecologist poll

Should the UK be able to feed itself from its own farms?

67 **per cent** of you said that modern students are worse activists than those of '68

LEAVE NATURE ALONE

The naïve can-do optimism of the US is widely admired, but this is part of an 18th-century enlightenment mindset that exaggerates the ability of man to dominate Nature, and sees Nature as a simplistic aggregate of exploitable resources. US efforts to control the weather for economic and military motives conveniently ignore the organic and interconnected nature of global weather. In seeking short-term and localised effects they seem conveniently to have ignored the ripple effects on adjacent and continental weather patterns, which, given the complexity of weather systems, must remain largely random and unpredictable. The same approach was adopted with regard to genetic modification. DNA was seen as a sort of sticklebrick set of interchangeable parts – perhaps still is by some – when in fact the whole thing is far more complex and fraught with collateral effects that begin with unforeseen damage to the organism being modified and then have the possibility

of spreading to the whole ecosystem. The terrifying thing about these myopic and ill-informed schemes is that once the weather has been changed, once the gene pool has been corrupted, there might not be any way to put the genie back in the bottle.

Rob Bronwell, via email

SOLAR NOT NUCLEAR

There is no need for nuclear power in the UK (or anywhere else in Europe) because there is a simple mature technology that can deliver huge amounts of clean energy without any of the headaches of nuclear power (see *Letters*, Dec/Jan).

I refer to 'concentrating solar power' (CSP), the technique of using mirrors to create heat from sunlight, and then using the heat to raise steam and drive turbines and generators, just like a conventional power station. It is possible to store solar heat in melted salts so that electricity generation may continue through the night or on cloudy days. This technology has been generating electricity successfully in California since 1985 and currently provides power for about 100,000 Californian homes. CSP plants are now being planned or built in many parts of the world.

CSP works best in hot deserts and, though there not many of these in Europe, it is feasible and economic to transmit solar electricity over long distances using highly efficient 'HVDC' transmission lines. With transmission losses of some three per cent per 1000 km, solar electricity may, for example, be transmitted from North Africa to London with only about 10 per cent loss of power. A large-scale HVDC transmission grid has also been proposed by wind-energy company Airtricity as a means of optimising the use of wind power throughout Europe.

The potential is massive. Less than one per cent of the world's hot deserts could produce as much electricity as the world currently consumes. A report from the American Solar Energy Society says CSP plants in south-western states 'could provide nearly 7,000 GW of capacity, or about *seven times the current total US electric capacity* [emphasis added].'

In the German Aerospace Center's 'TRANS-CSP' report, it is estimated that CSP electricity, imported from North Africa and the Middle East, could become one of the cheapest sources of electricity in Europe, including cost of transmission. The report shows in great detail how Europe can simultaneously meet all its electricity needs, make deep cuts in CO_2 emissions and phase out nuclear power.

All the necessary technologies are ready to go. It would be technically feasible to start delivering solar electricity from North Africa to the UK within five years. What is mainly required are changes in the regulatory framework governing electricity trading and transmission, and the right framework of incentives. Further information may be found at www.trec-uk.org.uk and www.desertec.org

Dr Gerry Wolff, TREC-UK

Daily dilemmas

In each month's issue, we ask a common ethical question that many of us ponder in our day-to-day lives, and people can go to our website and offer their suggestions as to how to answer it. In a subsequent issue we will publish the most practical and engaging selections in the letters pages.

How can we learn to share our space with wild animals?

Go to **www.theecologist.org** to have your say

OVERPOPULATION CRISIS

I greatly welcomed your editorial, *Gimme Shelter* (Dec/Jan). The environmental movement has for too long denied the role of burgeoning human numbers in environmental destruction, preferring to pin all the blame on technology and lifestyle, instead of accepting population as a third, equal factor. But at least one organisation concerned about ecological destruction has been trying to break the taboo on such debate for the past 15 years: the Optimum Population Trust.

It is difficult to see how the UK is responsible for 15 per cent of the world's emissions of CO_2, but even if the figure is correct then taking in 15 per cent of the world's environmental refugees would be ecological madness. The UK's 60 million already greatly exceeds the bio-capacity of our islands. Using the footprinting technique employed by WWF in the Living Planet Reports, we estimate that even if the UK per capita footprint was reduced from 5.5 average global hectares to 3 gha/cap – which would entail a huge effort in technology and lifestyle change – the UK could sustainably support only 30 million. The present 60 million (rising rapidly) depend greatly on imports of key resources from elsewhere, and impact seriously on our water resources and biodiversity.

Policy must surely concentrate on development help for countries most at risk, so that their people can be relocated and provided for using sustainable technologies, alongside support for all non-coercive efforts for halting further population growth – in the UK and worldwide.

Val Stevens
Optimum Population Trust

RECOMMEND GREEN READS

I'm following Robert Llewellyn's wonderful example and trying not to make any purchases at the moment, certainly not of any new items. With this in mind, and as many of your readers are probably doing the same thing, could you include a regular book review of classic eco-texts that we can borrow from a library or easily purchase second-hand? I'd suggest Seymour's *Guide to Self-Sufficiency* as a good starting point, but I'd really like to be pointed in the direction of some good reads about all things green (if only to win more arguments with my eco-geek friends!).

Kasha Button, by email

Laura Sevier recommends: *Save Cash and Save the Planet* by Andrea Smith and Nicola Baird (Collins), *Downshifting* by Polly Ghazi and Judy Jones (Hodder & Stoughton) and *The Penny Pincher's Book Revisited* by John and Irma Mustoe (Souvenir Press). See www.selfsufficientish.com for more ideas.

FOOD AND DIET

DO U LUV JUNK FD?

JUNK FOOD ADVERTISING TO CHILDREN IS RIFE, NEW REPORT SAYS

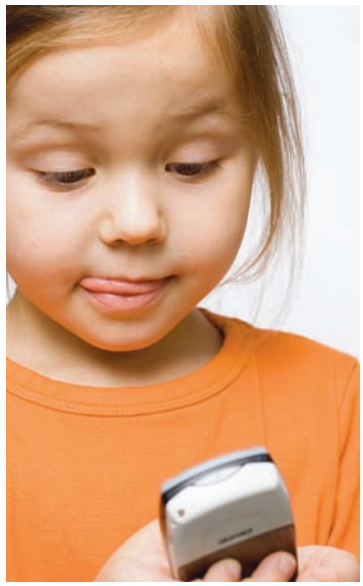
Text messaging, child-height product placement, brand cartoons – just some of the methods used by the junk food industry to promote products and develop brand recognition among children.

A new report by the British Heart Foundation and the Children's Food Campaign has revealed how companies such as McDonald's, Coca-Cola, Nestlé, Mars and some supermarkets are encouraging children to buy foods high in refined sugars and fats.

The industry – which is allowed to regulate its own non-broadcast advertising – uses a raft of marketing methods, including developing online computer games saturated with products and branding, sponsorship of children's events, lurid product colouring and cute and novel packaging.

While the Government has introduced limited controls on TV junk food ads, many believe such measures are in themselves inadequate. The broadcast restrictions apply only to programmes where the audience includes 20 per cent more children than adults, and as a result have little effect on children's actual exposure to TV junk food ads.

A 2007 *Which?* study showed that of the 10 most popular shows watched by children under 10 years old, only two were covered by the new regulations – heightening calls for a 9pm watershed on all TV junk food ads. Yet in its recent Obesity Strategy, the Government pledged merely to keep the restrictions 'under review'.



Now, in addition to tighter rules on TV ads, the authors of the Children's Food Campaign report are calling for tough regulations for non-broadcast junk food advertising across all media.

Richard Watts, co-ordinator of the Children's Food Campaign, told the *Ecologist*: 'The current system of self-regulation is clearly not fit for purpose in the 21st century. It is designed to prevent dishonest claims, not to improve children's health.'

According to Watts, the junk food industry has been 'getting away with it' for far too long.

'Properly enforced statutory rules are the only way to protect our children from junk food marketing,' he added.

The report is backed by MP Nigel Griffiths, whose Food Products Bill will be debated in Parliament in April.

REGULATION

PUT UP OR SHUT UP

'Stop whingeing!' That's the message to the European automotive industry, put out by the continued objections of UK business and environmental coalition the Aldersgate Group to EU vehicle emissions targets.

'Overreacting to progressive change seems to be the car industry's stock in trade,' said the group's chairman, Peter Young. 'In fact, sufficiently robust car-efficiency proposals would actually drive innovation and create jobs, as well as hugely benefiting the environment and European economy as a whole.'

The coalition, which includes the likes of BT, Biffa and United Utilities, pointed to the reaction of the industry in the 1990s over catalytic converters. Instead of raising car prices by between £400 and £600, as predicted by the car manufacturers, the eventual impact of the converters was a rise of between £30 and £50.

SELF-SUFFICIENCY

BIRD FEVER

Back yard hen-keeping is on the rise in the UK, according to the Henkeepers' Association.

The group, whose membership is growing at a rate of 20 new members a day, puts the number of garden fowl keepers at around 350,000. Chair of the Henkeepers' Association, Francine Raymond, said that a need for trust in food was driving the increase.

'Most of the these people are back-yard hen keepers, largely doing it for the first time. People have lost faith in supermarkets and want to produce their own food,' she told the *Daily Express*.

Raymond added that hen-keeping had never been easier, and that poultry suppliers were now offering 'starter packs' – including birds – for £300.

CORPORATE LOBBYING

CLEAR AS MUD

The Alliance for Lobbying Transparency is calling for complete disclosure of Westminster lobbying activities.

The Alliance is acting partly in response to a blocked Freedom of Information request made by Friends of the Earth. The green group had requested the minutes of meetings between the Confederation of British Industry (CBI) and the then Department of Trade and Industry (now BERR).

Although the DTI was ordered by the Information Commission to release the minutes, it has now taken the request to the Information Tribunal in a last-ditch attempt to prevent the documents from being released.

Former Friends of the Earth director Tony Juniper said: 'If

GO FIGURE...

Last year was the joint **second** warmest year on record and natural disasters caused **$75 billion** of economic losses in 2007. The US Energy Bill will reduce emissions by only **4.7%** by 2030. Solar cell production increased by **50%** in 2007. Road traffic rose **12%** between 1997 and 2006. **One in eight** 16- to 19-year-olds supports a ban on leisure air travel. UK power companies have made **£9 billion** from EU Emissions Trading. Britons spend **£2,572** making their homes eco-friendly. Nearly **5 million** employees worked unpaid overtime in 2007. **10** companies control half the world seed market. There are **2.4 billion** items of unworn clothing in the Great British wardrobe.

lobbying takes place in secret, the public is in no position to assess whether decisions are taken in the public interest or biased towards industry. The time has come to bring lobbying out of the shadows.'

SPIN
PALMED OFF

The Advertising Standards Agency (ASA) has ruled 'sustainble palm oil' is a contradiction in terms.

The ASA upheld a complaint by Friends of the Earth against a TV advert by the Malaysian Palm Oil Council, which claimed that palm oil had been 'sustainably produced since 1917' because palm olive trees 'help our planet breathe'.

Friends of the Earth pointed out that 86 per cent of deforestation occurring in Malaysia between 1995 and 2000 was as a result of palm oil development, and that displaced carbon dioxide from drained peatlands accounts for eight per cent of the global annual total emissions.

DEVELOPMENT
RICH BUT DIM

As we get wealthier, we lose our knowledge of the natural world.

That's the conclusion of new research by sociologists at the University of Essex, who compared knowledge of local plant species between residents in the UK, India and Indonesia.

They found that rural UK residents earning an average of £13,191 identified the fewest number of plants correctly (24 per cent), while their counterparts in Indonesia, earning around £1,081, could identify 71 per cent.

But the effect was noticeable in countries as well, and even between villages. Wealthy Indonesian villagers could name on average 18 fewer species than those in neighbouring villages with lower incomes.

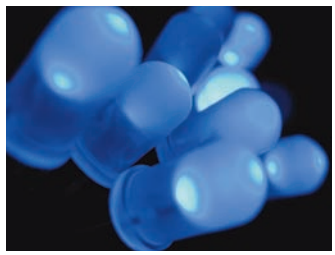
The findings cast doubt on the scope for local communities to grow richer and also manage and protect their own ecosystems.

Professor Jules Pretty, one of the study's authors, said: 'You won't invest time in protecting something that you don't love – and you can't love something that you don't know.'

TECHNOLOGY
LIGHTING UP

The case for moving to highly efficient Light Emiting Diode (LED) bulbs for home illumination has become stronger following health concerns over electro-magnetic radiation released by standard energy-saving bulbs.

Health charity Spectrum warned that small amounts of ultraviolet light emitted by the bulbs could lead to skin rashes in those with existing conditions, and there have been reports of migraines and epileptic seizures.



The worries come as scientists at the University of Glasgow publish experiments that show light output from the much safer LED bulbs is dramatically increased by perforating the bulb surface with billions of tiny holes.

POLLUTION AND HEALTH
DIABETES RISK

A commentary by two scientists in the *Lancet* journal has added weight to existing data that implicates persistent organic pollutants (POPs) in the onset of type 2 diabetes.

POPs, found in many pesticides including DDT, are thought to play a role in the insulin resistance that can lead to adult diabetes.

Because POPs biodegrade extremely slowly, many persist in the environment – as well as in food chains – for years.

MOBILE PHONES
MAST BLOCKADE

Parents of children at a school in Coulsdon, near Croydon, have blockaded contractors from phone operator T-mobile who were trying to erect a mobile mast just yards from Chipstead Valley Primary school.

The parents, who together have formed the Radio Action Group, used their cars to stop a crane reaching the proposed site.

They point out that there are already 15 masts within a single square mile of the school, as well as clear scientific evidence that mobile phone radiation can have a damaging effect on the health of young children.

The protest comes as a study funded by the mobile phone industry itself shows that using mobile phones before going to bed disrupts sleep and causes headaches. The scientists behind the study believe that the phone radiation engages the brain's stress responses, making relaxation and deep sleep more difficult to achieve.

CLIMATE CHANGE
ERA TODAY...

It's not something to be particularly proud of, but humans have created their own epoch of geological history, according to group of scientists from the Geological Society of London.

The geologists argue that we are currently living in the 'Anthropocene' era, a term coined in 2002 by Professor Paul Crutzen, which indicates the huge impact that man has had on his environment.

Human activity over the last 200 years has changed patterns of erosion and sediment deposition, disturbed the carbon cycle, acidified the oceans and triggered the beginnings of a mass extinction of plants and animals, the scientists said.

GREEN SCHOOL NETWORK

Green architect and mother-of-two Joanna Saady is hoping to improve on the established 'Eco Schools' certification programme by getting schools involved to talk to each other and swap ideas. She is launching a registry – initially just for 80 schools in Sussex – which will allow teachers and pupils to give tips on best practice.

Contact Joanna for more details, tel 0845 026 4636.

NO AIR MILES

The No Miles High Club is a new kind of loyalty initiative which rewards members for not flying.

The club will only admit members who have pledged not to take any flights for a whole year. Signing on the dotted line will get you a range of green discounts, including the chance to win Eurostar tickets.

Founder Richard Lane said that the motivation behind the club was to help show that others are making the sacrifice, too.

For details, see www.nomileshighclub.org.uk

LANDFILL PRIZE

Environmental author John Naish is soon to award 'The Landfill Prize' – an award for the Britain's most useless consumer product.

Designed to highlight the mores and madness of consume culture, visit www.enoughness.co.uk to find out who won the award.

NUCLEAR POWER

NUCLEAR FEVER SPREADS

GORDON BROWN'S GREEN LIGHT FOR NUCLEAR HAS TURNED HEADS ON THE CONTINENT AND COULD LEAD TO A NEW NUCLEAR EUROPE

The UK Government's decision to write a blank cheque to the nuclear industry could have Europe-wide ramifications.

Shortly after the announcement, Swedish Liberal Party leader Jan Björklund proposed that Sweden should break with a long-held moratorium on nuclear power and build four new nuclear reactors, in addition to replacing the country's existing 10.

His proposal runs counter to a 1980 referendum, when Swedes voted to phase out their crumbling nuclear infrastructure.

Industry figures in Germany said the UK decision would be welcomed.

'I think that this UK message will be very influential in Germany,' Luis Echávarri, director general of the Nuclear Energy Agency, told the *International Herald Tribune*.

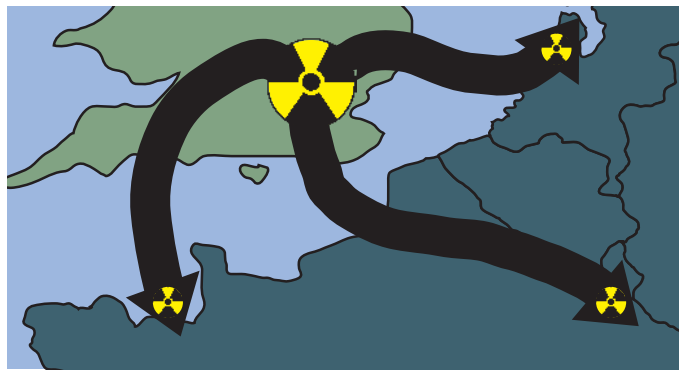
'Gordon Brown comes from the Labour Party and he's very committed to climate change, so this is a very clear indication that you have to be pragmatic.'

Echávarri's ambitions would go against a landmark decision in 2000 by then president Gerhard Schroeder not to build any more nuclear plants in Germany, a decision that is already under threat from pro-nuclear members of Andrea Merkel's government. They could also be a shot in the arm for corporate lobbying in Germany, including the efforts of Swedish-owned energy giant Vattenfall. The state-run company has previously been censured by Swedish politicians for lobbying the EU to support nuclear power while under the ownership of a country in the process of phasing out atomic energy.

The role of France as the ambassador of nuclear power may have been further bolstered by the UK's decision. Greenpeace nuclear campaigner Ben Ayliffe said:

'It doesn't take a genius to see how Gordon Brown was influenced by the nuclear industry, including his younger brother, Andrew Brown, who works for French company EDF as head of press. EDF and Areva are currently doing the rounds with President Sarkozy all over the world to sell nuclear power.'

Ayliffe confirmed that Greenpeace is still considering a legal challenge over the outcome of the UK Government's nuclear consultation, which could stall the opening of any new plant until the late 2020s.



POLITICS

WHOSE WHO?

The International Atomic Energy Agency (IAEA) has been allowed seriously to restrict the involvement of the World Health Organization (WHO) in the aftermath of the Chernobyl disaster, claims a group of NGOs.

Health professionals across the world are calling for the WHO to be made truly independent and free of a 1959 agreement that means the WHO needs to 'consult' with the IAEA and adjust its advice for 'mutual agreement'.

The group of NGOs – www.independentwho.info – says in an open letter to the director general of the WHO that the outdated agreement has led to a misrepresentation of the health impacts of the 1986 Ukrainian nuclear disaster and a lack of effective action to help the hundreds of thousands of people living with its consequences.

CLIMATE CHANGE

SAD AUSSIES

All's not well down under. Dr Glenn Albrecht, senior lecturer at the University of Newcastle, Australia, has identified a little-considered impact of climate change: human sadness.

He calls it 'solastalgia' – a term built from the Latin for comfort (*solacium*) and pain (*algia*) – which refers to the deep feeling of loss and displacement people experience when their native land undergoes dramatic change.

Albrecht first observed the phenomenon among inhabitants of the Upper Hunter Valley, New South Wales, whose homes had been devastated by open-cast mining, but now believes it could become a frequent occurrence.

'The experience of solastalgia might well be ancient and ubiquitous, and under the impact of relentless environmental change, ecosystem distress and climate chaos it may well become much more common,' he writes.

TOXIC CHEMICALS

FORMULA RISK

In addition to the dangers posed by substituting formula for breast milk, new evidence shows that infants could be getting a dose of hormone-disrupter Bisphenol-A with their bottles.

The US Environmental Working Group (EWG) warns that major manufacturers of leading brands such as Good Start (Nestlé), Similac (Ross-Abbott) and Enfamil (MeadJohnson) exceed safe levels of the chemical in the packaging of their products.

Bisphenol-A can seep into the formula and has been linked by scientists to reproductive problems. There is particular concern about its effects on very young children.

Sonya Lauder of the EWG says 'US manufacturers of infant formula and baby bottles can and should do the right thing and remove this harmful chemical from their products.'

GREEN TECHNOLOGY

HOT ROADS

Dutch civil engineering firm Ooms Avenhorn has adapted a system designed to extend the life of roads and generate useful heat.

Originally conceived 10 years ago, the system pumps water through a latticework of pipes laid underneath roads and car parks, using the solar properties of asphalt to heat water. This was designed to prevent ice forming on the road surface, reducing

accidents and the increasing the lifespan of the road.

During the summer months, the system's designers discovered they were capturing more energy than required, and by storing the water underground at 20ºC it can be retrieved in winter to heat the roads and surrounding buildings.

Although it doubles the cost of road-building, the system helps to cut energy use for heating and cooling by 55 per cent.

BIOFUELS

CAR HARVEST

Almost a third of this year's US grain crop may be diverted from the table to the petrol tanks of America, says Lester Brown of the Earth Policy Institute.

Brown described the price of grain as now 'tied to the price of oil,' and pointed out that its value has risen 100 per cent since 2005.

As more refineries come online, US farm subsidies mean that farmers are anticipated to grow 30 per cent of next year's grain crop for use as ethanol. Brown warned of the knock-on effect this will have on food stocks in an economy where 'our refrigerators are stuffed with corn'.

The news comes as the UK Environmental Audit Committee called for a moratorium on current EU targets for biofuels.

GREENWASH

GREEN FLY

Singapore has opened a new 'green' airport terminal, sporting energy-saving skylights, a wall of hanging basket plants, a butterfly garden, koi ponds, low level air conditioners... oh, and a passenger capacity of 22 million per year, with special facilities to cater for the new Airbus A380 superjumbo.

NOW THAT'S... PROGRESS

1. Scientists have suggested planting crops that have been genetically modified to be extra hairy, so that their leaves bounce sunlight back into space and reduce global warming.

2. An investment strategist at Citigroup has come up with a shortlist of companies that will benefit from ecological catastrophe. It includes Monsanto, Nestlé and Syngenta.

3. The US Nuclear Regulatory Commission is facing investigation after failing to act on reports of security guards at a nuclear power station falling asleep while on duty.

4. Her Majesty's Stationery Office is suing a small wind-turbine supplier for making Ordnance Survey data available online for planning application purposes.

INSURANCE

WRITE-OFF

Global warming is making an increasing number of properties in the US uninsurable, according to a new report by green group Environmental Defense.

The report draws attention to one of the nation's largest insurance providers, Allstate, which will no longer insure 40,000 coastal homeowners in New York, or sign any new policies in the state of Florida. In Alabama premiums have risen tenfold, while Texas, Virginia and Louisiana have all seen increases of 50 per cent or more.

'Global warming has begun to wreak havoc with one of the major tenets of insurance pricing,' the report says. 'No longer can insurers look to the past for an accurate read on what might happen in the future.'

CARBON DIOXIDE

DEATH BY CO_2

Each degree of global temperature rise this century could lead to 20,000 deaths worldwide as a result of air pollution, scientists at a US university have revealed.

Researchers at Stanford University, California, showed that chemical and meteorological changes due to rising atmospheric carbon dioxide concentrations lead to increased levels of ozone, particulates and other carcinogens.

'Ultimately, you inhale a greater abundance of deleterious chemicals due to carbon dioxide and the climate change associated with it,' said Professor Mark Jacobson.

PROTEST

COAL CALLED

Buoyed by the cancellation or delay in building more than 50 coal-fired power stations in 2007, US activists are gearing up to tackle the coal industry head-on in 2008.

In Montana, green group Earthjustice is planning to appeal a decision to allow the construction of a new 250-megawatt plant; in Georgia, another group is appealing a 1,200-megawatt plant, while in Arkansas, local landowners are challenging a 600-megawatt plant.

Regulators are also playing a role. In Washington and Kansas, state authorities have banned any new coal power plants, and city legislators in Donegal Township in Pennsylvania have outlawed mining in the area. The legislation also strips corporations of their usual rights while operating in the township and forbids them to contribute money towards local politicians' electoral campaigns.

B CORPORATION

Distinguishing truly good companies from just good marketing is becoming increasingly difficult. Now a new American non-profit organisation known as 'B Corporation' is trying to cut through the confusion with a new standard.

To become a 'B (beneficial) Corporation', a company will need not only to meet a series of social and environmental standards, but also amend its corporate charter. The revised charters are to state manager must consider the interests not simply of the company shareholders but also employees, community and the environment.

This means that the new values will be more likely to survive any changes in management or ownership, and also allows managers to make decisions that are not solely to the benefit of their shareholders.

'You run into fundamental problems in trying to "grow good", because neither for-profit nor non-profit is set up to do what new entrepreneurs and others are trying to do – namely, harness the power of private enterprise to create social benefit,' said one of B Corporation's founders, Jay Coen Gilbert.

For more information visit www.bcorporation.net

Reduce, reuse, remanufacture?

Is there life before recycling for old electronic products? **Mark Anslow** reports

Recycling is great. And growing in popularity. But breaking down newspapers, tins, plastic bottles or aluminium foil into their original materials can use large amounts of energy, water and other chemicals. Wouldn't it be better if materials were purposefully designed to be returned to a useful state at the end of their life?

This is the thinking behind growing research and development into 'remanufacturing'. It's not a new idea: reconditioned electronic goods and 'remould' tyres have been around for years – and have historically been viewed suspiciously by consumers. But the rising cost of production and a growing waste problem is driving a new breed of manufactured product.

Casper Gray is the director of design consultancy Wax RDC, and has been tasked by a mobile phone manufacturer with developing a handset that can easily be upgraded or reused. With more than 15 million mobile phones replaced every year in the UK – and an estimated 75 million lying around in the nation's drawers – Gray has an expectant industry looking over his shoulder.

'One of our ideas is to design a product for "active disassembly",' he explains. 'By sealing phones together with a polymer [glue] that is designed to unstick when exposed to certain temperatures or vibrations, we can make a product that can be posted back to the manufacturer at the end of life, then quickly dismantled and the insides recovered.'

The other option is for owners themselves to upgrade the phones. Gray and his team have plans for a phone that can be upgraded by removing outdated parts and adding new ones. 'This allows for continued innovation, but reduces waste,' Gray claims.

One area where remanufacturing has always played a role is in mechanical engineering. Amedeo Aversa is director of business development at automotive engineers MCT Mitchell Cotts. His company, which has years of experience fixing broken gearboxes for car manufacturers, is turning its attention to wind turbines and tidal generators. He laments the fact designers in these time-pressured fields often don't think about what will happen to their products at the end of their useful life.

'Repurposing electronic components is better than recycling them'

'The problem in emerging technologies such as marine generation is that engineers are so busy trying to get the machine to work they are not concentrating on its potential for remanufacturing, which is disappointing,' he says. 'But in the wind industry, reconditioning gearboxes instead of simply replacing them can bring big environmental and cost benefits.'

Professor Martin Goosey of Loughborough University is part of a team at Active Recycling Ltd looking at how redundant electronics can be 'repurposed'. He is working on a technique to reprogramme old Sony mobile phones for use as the 'brains' of useful monitoring devices, such as energy or water meters in homes (see picture, below).

'Electronic waste is Europe's fastest growing waste stream,' Goosey points out. 'Each year, 900,000 tonnes of it is sent to UK landfills alone. But producer responsibility legislation, such as the recent WEEE initiative, which requires manufacturers to take back old electronic products, is forcing them to rethink. Repurposing or recovering electronic components is much better environmentally than simply recycling them.'

But remanufacturing doesn't have to be high-tech. One of the most successful initiatives is run by environmental entrepreneur group Bioregional. Funded by the Government, Bioregional runs a reclamation network that collects used building materials and makes them available for new projects. Recycling uses large amounts of energy to crush up bricks for hardcore, remelt steel or chip up timber; remanufacturing allows Bioregional's team to resell floorboards and timber, reuse bricks and clean up reclaimed sections of steel. The group's not-for-profit demonstration centre will remanufacture around 5,000 tonnes of material each year.

The road to remanufacturing won't be easy; deeply entrenched consumer and manufacturer beliefs will make the 'buy and throw' mentality difficult to beat.

'There needs to be a shift in mindset,' says Goosey. 'People, especially in the UK, like owning new things. Perhaps we're simply too wealthy, but it's also a cultural phenomenon – in certain parts of Europe buying remanufactured products is more acceptable.'

Remanufacturing poses legal problems too. Who is liable if the new product malfunctions, for example? Recycling legislation such as WEEE could even end up working against remanufacturing, by offering manufacturers the simple 'melt down and forget' option, rather than the more complex reuse option.

That said, the potential for remanufacturing is clear to those already involved. As Casper Gray says: 'If we want to continue buying things, I truly believe that remanufacturing of some sort is the only option.'

Mark Anslow is the *Ecologist*'s senior reporter

For more information, visit www.remanufacturing.org.uk

Image: ACTIVE RECYCLING LTD

the Green Show

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Showcasing some of the spectacular organic, fair-trade and ethical clothing out there, with shows throughout the day.

CALCULATE YOUR CARBON FOOTPRINT

Learn the impact of your lifestyle on the environment using and then learn how to offset it!

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Some familiar faces will be running cookery sessions and teaching us how to shop for food, grow food and make food in a sustainable way...

THE GREEN SHOW MAKEOVER ZONE

Learn about the huge range of natural, eco-friendly and body-friendly products out there, then have a go yourself!

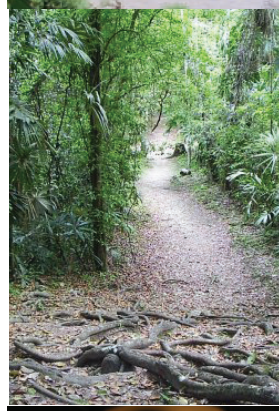
ECO HOME ZONE

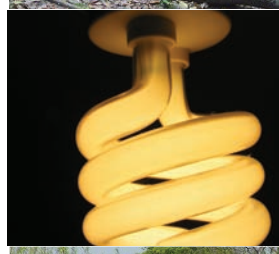
With the help of high profile eco experts, learn how to give your home a green makeover. Enjoy modern design advice, energy saving tips, and money-saving know-how from the experts!

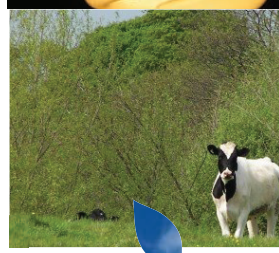
CINEMA ZONE

Chill out and choose a FREE 'green' movie to watch!

Neither beard nor hair-shirt required!







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DEVELOPING ECONOMIES

The North-South divide

Rich industrialised countries have a responsibility to help others stick to their green responsibilities, argues **Helena Norberg-Hodge**, not collude in helping shirk them

As signs of climate instability increase, radical and rapid action is becoming ever more urgent. One of the greatest obstacles to global collaboration, however, has been the Bush administration's foot-dragging and obstructionism, much of it based on the fear of giving developing economies a 'competitive advantage' if they are permitted to emit greenhouse gases at higher rates than those in the more developed North. Yet even within the environmental movement there is no unanimity on this thorny question: should the countries of the global South have the right to increase their emissions as they industrialise and 'develop'?

At first glance, it makes a lot of sense that they should, based both on notions of equity and the feeling that rich countries have no right to make demands of the so-called poor countries: We in the 'North' have benefited from 'development', how can we deny the 'South' the right to follow in our footsteps?

This argument suffers from two key flaws. First, people in the South simply cannot replicate the development path taken by the North: not only has our 'development' already used up too much of the planet's resources – including its ability to absorb CO_2 emissions – but the South has no colonies to supply it with cheap resources and labour, no 'Third World' to exploit. Second, arguing for equity ignores the fact that development and globalisation do not benefit the majority, but have instead been responsible for a dramatic increase in poverty, while benefiting only a small, wealthy elite.

This latter point underlies the dark reality behind the US government's attitude to climate change. As Walden Bello, executive director of the group Focus on the Global South, has written:

'When the Bush administration says it will not respect the Kyoto Protocol because it does not bind China and India, and the Chinese and Indian governments say they will not tolerate curbs on their greenhouse gas emissions because the US has not ratified Kyoto, they are in fact playing out an unholy alliance to allow their economic elites to continue to evade their environmental responsibilities and free-ride on the rest of the world.'

According to Bello, the US has formed an 'Asia-Pacific' partnership with China, India, Japan, Korea and Canada as a rival to the Kyoto protocol, in order to promote the notion of voluntary instead of mandatory curbs on CO_2 emissions. He further argues that it is the wealthy elites that 'spout the ultra-Third Worldist line that the South has yet to fulfil its quota of polluting the world while the North has exceeded its quota. It is they who call for an exemption of the big rapidly industrializing countries from mandatory limits on the emission of greenhouse gases under a new Kyoto Protocol.'

> In the slums, the quality of life declines but consumption increases. Even for those on a starvation diet, food has to be packaged

Today, most manufactured goods and agricultural products consumed in richer countries are produced in the South. Global corporations benefit from raw materials and cheap labour to be found there. In industrialised Northern countries, where salaries are high and resources are both more depleted and protected, the profit potential for global corporations is not as large, so expansion into the South is essential for their growth. And it is these institutions behind the notion that people in the North cannot tell the South to limit their carbon emissions. In fact, some years ago, Lee Raymond, president of Exxon-Mobil, travelled the poor world, warning leaders not to participate in treaties on climate change if they wanted to attract foreign investment.

In this sense, 'telling the people of the South what to do' is precisely what Northern institutions are doing by imposing export-oriented, fossil fuel-based development on them. Government aid, direct foreign investments and the policies of the WTO, the IMF and the World Bank are foisting ever larger-scale infrastructures on the South – mega-dams and fossil fuel-based power plants; superhighways and shipping terminals. Meanwhile, transnational corporations (TNCs) bombard the South with advertising images promoting an urban, consumer lifestyle. If addressing climate change requires limits on Southern greenhouse gas emissions, this is not telling the people of the South what to do, it is telling TNCs and the global elite that they cannot continue shaping the South for their own short-term interest.

The globalisation of the economy is also responsible for uprooting millions of people in the South, by destroying rural livelihoods and local markets. Policies promoting large-scale centralised energy installations and export-led development feed the mass migration from rural areas – where people have relatively better food security and quality of life – into vast shanty towns. In the slums, the quality of life declines but consumption increases. Even for those on a near starvation diet, every pound of food consumed has to be transported and packaged, so CO_2 emissions rise.

These same globalising policies lead to a massive increase in redundant trade: identical products (butter, milk, potatoes, animals) criss-cross the globe in ever-increasing quantities. This system does not promote efficiency, but rather leads inevitably to an increase in poverty, waste and greenhouse gas emissions.

It is essential for richer countries immediately to reduce their consumption of fossil fuels, as well as other natural resources. And there is no doubt that the global North should bear the financial burden of reducing CO_2 emissions. However, it does not make

sense to argue in the name of equity and justice that the global South should have the right to continue increasing its CO_2 emissions. To a great extent, those emissions are our dirty laundry. They are the waste caused by using the most fertile lands of Africa to grow the vegetables that fill the aisles of European supermarkets. They are the smoke billowing from the factories of China that produce an endless stream of plastic trinkets for our manufactured consumer needs. They are the pollution created by sweatshops churning out goods that we could perfectly well produce for ourselves, allowing peoples of the South to use more of their labour and resources to provide for their own needs.

One of the best ways of reducing both CO_2 emissions and poverty in the South would be to strengthen the existing, decentralised demographic pattern by keeping villages and small towns alive. This would allow communities to maintain social cohesion and a closer contact with the land. A strategic way of doing so would be to help provide decentralised renewable energy to the rural peoples of the South (who constitute almost half the global population). It would be relatively easy to do so: throughout the less industrialised world there is a tremendous potential for using solar, wind, and small-scale hydro. To introduce such an infrastructure would cost vastly less money than the mega-billion dollar projects that are encouraging fossil fuel consumption in the South. This could also help dramatically improve people's material standard of living, and prevent the tragic mass migration into slums, where quality of life drops dramatically and dependence on petroleum and other non-renewable resources escalates.

As Walden Bello points out: 'One cannot depend on the elite and the middle-class in the South to decisively change course... The fight against global warming will need to be propelled by an alliance between progressive civil society in the North and mass-based citizens' movements in the South.'

The movements in the North need to wake up to Bello's message. E

Helena Norberg-Hodge is the founder and director of the International Society for Ecology and Culture, a non-profit organisation concerned with the protection of both biological and cultural diversity. She is also a co-founder of the International Forum on Globalization (www.ifg.org)

CURRENTS

Coal is over

It was probably the most important letter the Prime Minister has received in his time at Number 10. The world's most eminent climate scientist, a director of NASA and one of the first in the world to warn of global warming, took the unprecedented step of writing to Gordon Brown to tell him his energy policy could be a 'tipping point for the world'.

Jim Hansen wrote: 'Your leadership is needed on a matter concerning coal-fired power plants in your country, a matter with ramifications for life on our planet, including all species. Prospects for today's children, and especially the world's poor, hinge upon our success in stabilizing the climate.'

His letter to Downing Street also says: 'You have the potential to influence the future of the planet... If we continue to build coal-fired power plants without carbon capture, we will lock in future climate disasters associated with passing climate tipping points.'

Despite pleas from scientists, the Government is considering approving a whole new generation of unabated coal-fired power stations, beginning with Kingsnorth in Kent. A green light could become the defining climate decision of Brown's premiership – signalling he is going to surrender the UK's commitment to 60-80 per cent cuts in emissions by 2050.

The Kingsnorth application sitting on the Prime Minister's desk asks for permission to build a dinosaur power station so inefficient it will waste almost half the energy it creates. If approved, it will burn the dirtiest fuel available and pollute more each year than 30 entire countries – eight million tonnes of CO_2. Seven other plants are also in the pipeline in Scotland, Yorkshire, Northumberland and Essex. New British open-cast coal mines are also planned, including the biggest ever at Ffos-y-Fran near Cardiff, which will strip 1,000 acres of biodiverse habitat.

Despite greenwash from the coal industry suggesting the new plants could be 'cleaner' with so-called 'carbon capture technology' (CCS), this technology is, to quote Chancellor Alistair Darling, 'still in the foothills' and 'may never work'. In fact, there is no commercially operating 'CCS' plant anywhere in the world and even on the industry's own best projections, coal plants could not operate commercially with this equipment until 2020. The UN's top scientists suggest it could be decades away.

Energy Minister Malcolm Wicks sits on the board of the 'UK Coal Forum', which was established to 'secure the long-term contribution of coal-fired power generation', so perhaps we shouldn't be surprised that, when asked on BBC *Newsnight* if he'd block plans for coal plants that did not have CCS, he answered, 'We won't say no, but in the long term we want them to have carbon capture and storage.'

Real climate-friendly solutions for energy security exist. In Denmark, power stations like the one at Avedore run at 94 per cent efficiency using state-of-the-art combined-heat-and-power (CHP) with renewables. In Germany, the government has created 250,000 green-collar jobs in six years, with 300 times more solar and 10 times more wind than the UK. If we had achieved the same level of development then today we would get 18 per cent of our electricity from renewables (as much as we get from all our nuclear power stations combined) and seven per cent of our heat as well. Instead, Britain lingers at the bottom of the European league table for renewable energy – just ahead of Malta. That's where we'll stay until coal is over. E

> "The Kingsnorth decision will signal whether Brown is going to surrender the UK's commitment to 60-80 per cent cuts in emissions

Joss Garman is an environmental campaigner and journalist

NUCLEAR ENERGY

Nuclearphile sabotage

The Government wilfully suppressed renewables to make space for nuclear to be reborn, argues **Jeremy Leggett**

The Government released its first energy white paper almost five years ago, when oil was barely $30 a barrel. The result of a thorough consultation with more than 60 energy companies, it called for deep carbon emissions cuts by 2050, to be achieved primarily by a massive programme of renewable and efficient energy mobilisation. Nuclear energy barely survived the consultation. During the Strategic Energy Review that preceded the white paper, I saw executives from nuclear companies literally laughed out of contention during debates about the economics of future energy supply. But senior officials at the Department of Trade and Industry (DTI) fought a rearguard action. Nuclear was granted a place on the back burner, to be reviewed after five years.

The DTI set up a Renewables Advisory Board to advise ministers on how to execute the white-paper plan in November 2002. I was invited to join it, and at the time I was encouraged. Twelve renewable industry executives joined senior officials from all relevant ministries on the board. There was a sense that we were there to make things happen fast: to help unlock doors. But by September 2003, the industry members of the board were troubled by slow progress and issued a statement of concern. In particular, we were worried that the short tenure of the Renewables Obligation was putting off investment in wind. Faced with this rebellion by its industry advisors, the Government extended the Renewables Obligation. But other doors were proving very difficult to open, notably an early recommendation by industry that government go out and fight a strong hearts-and-minds communication campaign to persuade the public that we needed a strong mix of fast-growing renewables markets, and why.

A fellow member of the board warned me that DTI officials were deliberately going slowly, and would continue to do so, aiming to keep their hopes for nuclear alive. Renewables, he feared, would be teed up to fail. I didn't believe it at the time. But recently I heard two of Tony Blair's senior colleagues confirm the DTI has long suppressed renewables to make space for nuclear. The slow-motion treatment of renewables that I have witnessed in the UK during the past five years, while renewables markets abroad have grown explosively, now makes a sickening kind of sense.

In 2004, oil hit $50 for the first time. New fears about energy security meant more than $30 billion of new investment flowed into renewables globally. Very little came to the UK. Much of it went to Germany, where the Germans have created more than 200,000 new jobs since 2000 in industries now exporting globally. UK plc meanwhile has been starved of opportunities both to create new jobs and compete in new global export markets.

Along the way, the nuclearphiles have jumped the gun on their five-year review. Tony Blair called for a second energy white paper, and by July 2006 the draft already backed a new generation of British nuclear power plants. At that time, nuclear inspectors were reporting unexplained cracks in six reactor cores in the existing generation. British Energy, it seemed, did not know the extent of the damage in the reactors, could not monitor their deterioration and didn't fully understand why the cracking had occurred. The DTI authors of the energy white paper, and their champion in Number 10, were undeterred.

Greenpeace challenged the legality of the second white paper process and in February 2007 the High Court ruled that the Government's review had indeed been unlawful. Another consultation began. Another year had been lost.

In March, Europe agreed a union-wide target of 20 per cent renewables in the energy mix. Twenty-seven leaders signed up, Blair among them. As a result of this and other market-building initiatives, global investment in renewables companies accelerated still faster in 2007. Share prices in renewables companies soared far ahead of normal stocks, while growing numbers of experts warned oil and gas were depleting faster than expected. But in the UK it was business as usual. In August, the *Guardian* revealed ministers were being briefed by DTI officials (now the Department of Business and Regulatory Reform) that the UK couldn't come close to a 20 per cent target. In a development beyond even the script of *Yes Minister*, options for wriggling out of the 20 per cent commitment included counting nuclear energy as renewable energy.

No doubt shamed by all this, Gordon Brown held the line, and is currently insisting the UK plays ball with the EU's 20 per cent target. But how will he deliver it, when his government has some of the least effective market-enablement programmes for renewable energy in the industrialised world? How, surrounded by civil servants intent on seeing a re-nuclearised Britain almost at any cost?

One of those most instrumental in engineering the nuclear renaissance was Blair's chief scientific adviser, Sir David King. People present in the crucial cabinet meeting where the 2003 energy white paper was finalised have described to me how King and other DTI officials stopped ministers shelving nuclear completely. In a *Guardian* interview on 12 January, King speaks with evident pride about how John Prescott became furious to the point almost of violence.

King went further in the interview and in his forthcoming books, labelling greens Luddites harming the fight against global warming. Many 'want to get away from all the technological gizmos and developments of the 20th century,' he professes.

Many greens I know are keen to drop 20th-century technologies, but only in that we are rather keen to progress to the technologies of the 21st century. The technologies of the present century look set to be very different from the technologies of the last, if you consider where energy investors prefer to put their money. The vast majority of venture capital investment in energy, and some of the most successful investments on stock exchanges in 2007, went to renewable and efficient technologies, and these offer at least a fighting chance of solving our energy problems.

Nuclear is one of those 20th-century technologies society has tried and found wanting. We can't build it fast enough to make a difference either to our clear-and-present climate change problem, or our fast-emerging

energy security problem. Even if we could, we haven't found a way to deal with its hideous wastes after half a century of effort. We can't afford it without endless blank-cheque subsidies, as opposed to the short-term, fixed-amount subsidies – or their policy equivalents – that renewables need in order to accelerate into mass markets. We haven't found a way to stop the people that run the industry from releasing a stream of lies, falsified documents, accident- and near-miss cover-ups, and consistent, huge and almost universal cost underestimates. If we plough ahead with nuclear power regardless, we face the fact that the separation between civil and weapons programmes is wafer-thin, and so effectively issue a licence to the rest of the world to proliferate nuclear weapons. Retired nuclear bomb designers have a tendency to profess that if and when civil nuclear programmes are resurrected on any scale, it is only a matter of time before the terrorists make it into our cities with suitcase bombs. Finally, if we build a new generation of nuclear reactors, by the Government's own admission they would need to be on existing sites: on the coast. The same government warns us, via its lead role in the Intergovernmental Panel on Climate Change, that the Greenland and Antarctic ice sheets are at risk of melting, which would lift global sea level many metres. Whither Dungeness then, a site where 600 tonnes of shingle already has to be dumped daily to keep the sea at bay? Some 20th-century technologies we do need to get away from. Nuclear power is one.

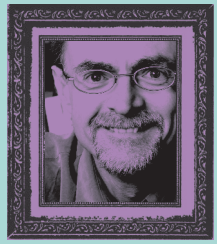
The book King has written to vent his rage against the greens, we are told, ends with a map of the world on which is superimposed six tiny squares. If all the light falling on those squares could be harvested, King explains, all the world's energy needs could be met. Indeed. This remarkable fact is the product of a nuclear reactor. That reactor is more than 90 million miles from our planet, and it is called the Sun. The power it could in principle generate within those tiny squares is called solar power. David King was until recently a lead player in a government that has acted for years as though it wants to slowly strangle any prospect of solar power in Britain. E

Jeremy Leggett is founder and chairman of Solarcentury and SolarAid, and author of *The Carbon War* and *Half Gone*. This article is an extended version of some of his writing on nuclear power and renewables in the *Guardian*

POST-CARBON LIVING

Beyond technofix

On 12 January, chief scientific adviser Sir David King told the *Guardian*, 'any approach that does not focus on technological solutions to climate change – including nuclear power – is one of "utter hopelessness".'



It is useful to have this view so succinctly stated, because it is nearly the reverse of the position I will be exploring in this column, which is that there is an overwhelming need for non-technological responses to our global environmental crisis.

In Dr King's view, climate change is caused by technology and so must have a technical solution. To me this is a blindingly superficial framing of the situation. It's not just climate change that threatens us, but depletion of resources including oil, fresh water and minerals (ranging from antimony to zinc, and including, significantly, uranium); as well as destruction of habitat and accelerating biodiversity loss, which is exacerbated by climate change, but also happens for other anthropogenic reasons. In essence, there are too many of us using too much too fast.

The problem is not merely technological; it is cultural in the deepest sense. Climate change is a side effect of fossil fuel consumption, and has emerged as the most critical symptom of a growth binge founded on a temporary subsidy of cheap hydrocarbon energy. But unless we address the core of the problem, other symptoms will soon overwhelm us.

Addressing the problem means letting go of growth and engaging in a period of controlled societal contraction. For anyone who understands the basics of ecology – the relationships between population, resources and carrying capacity – nothing could be clearer. But for those who see only technical problems with technical solutions, the forest remains lost behind a single tree.

> For those who see only technical problems with technical solutions, the forest remains lost behind a single tree

To be sure: minimally polluting technologies must be part of our response to climate change, but just as important are changes in attitudes, habits and expectations. A fundamental reworking of economic institutions and policies is more essential still, so endless growth ceases to be seen as good or even possible.

Some say climate change is so serious we must use any means at our disposal – including nuclear power – to address it. But there is no way we can substitute alternative sources of energy – including nuclear – for fossil fuels to reduce carbon emissions as much and as quickly as we must, unless we also reduce overall consumption. We have to downsize and re-localise our economies, and so culture change is indispensable.

King says environmentalists are keen to take society back to the 18th century. A fairer formulation of many views is this: unless we use technology within the context of a controlled, planned, sustained period of economic contraction, we will see a chaotic, depletion-led societal collapse that could make the 18th century look like Paradise.

Once one accepts this larger framing of the situation, a whole world of possibilities opens up, one that is far from hopeless and that engages human responsibility, creativity and community. It is characterised by cultural maturity, rather than the advertising-fuelled infantile attitude that assumes the world exists only to supply human wants. It is the world of post-carbon living toward which millions of citizens are beginning to transition. E

Richard Heinberg is a Senior Fellow of the Post Carbon Institute and author of *The Party's Over, Powerdown, The Oil Depletion Protocol* and *Peak Everything*

BEHIND THE LABEL:

Lucozade Sport with Caffeine Boost

Biological rocket fuel they may be, but 'sports' drinks can be a danger to health in the long term. **Pat Thomas** reports

Ingredients

Water, carbohydrate blend (glucose syrup, maltodextrin), citric acid, acidity regulator (sodium citrate), preservative (potassium sorbate), stabilisers (acacia gum, glycerol esters of wood rosins), sweeteners (aspartame, acesulfame K), caffeine (0/016%), antioxidant (ascorbic acid), flavourings, vitamins (niacin, pantothenic acid, B6, B12).

A stalwart of the UK soft drinks market, Lucozade has been around since 1938 and has dominated the UK market for much of that time. Having successfully distanced itself from a traditional image of hospital bedsides (it was once known as 'hospital champagne'), Lucozade has, in recent years, expanded its range to include a wide variety of 'functional' drinks that claim to be sporting aids and brain-boosters. Advertising campaigns featuring prominent sportspeople have helped boost the brand's popularity considerably.

Throughout the world, the market for functional drinks is growing. In 2006, western European sales grew by six per cent to approximately 4.5 billion litres – a 40 per cent increase in sales compared to 2001. In monetary terms, that translates to an increase from €8.5 billion in 2001 to €13.6 billion in 2006.

In the UK, the Lucozade brand – owned by pharmaceutical giant GlaxoSmithKline – is a market leader, with current annual sales of some £253 million. Nearest competitor Red Bull pulls in around half that.

Although Lucozade is notionally a sports drink – formulated to help improve athletic performance, at least in the short term, it is not solely consumed by sportspeople. Indeed, it seems likely that sportspeople make up only a tiny proportion of the brand's consumers. These days, energy and sports drinks appeal to a fairly broad audience, ranging from tired drivers and office workers putting in long hours to gym bunnies, clubbers and students, none of whom need or are looking to improve their sports performance.

According to market reports, sports and energy drinks are only regularly consumed by approximately 20 per cent of households; thus in sales terms it is a market ripe for growth. Should that market grow, however, what is it that we would all be consuming?

Lucozade Sport has its own scientific website, the Lucozade Sport Science Academy, devoted to disseminating research about the benefits of the product.

According to the site: 'The results of these studies... clearly demonstrate that the consumption of isotonic drinks has been associated with significantly improved performance in treadmill marathon and fixed-pace high-intensity treadmill running, and in intermittent high-intensity running which has been designed to mimic team sport activities like football. The studies also demonstrate that the consumption of isotonic drinks in the recovery period after exercise has been shown to lead to improved performance in subsequent exercise.'

The academy's website features summaries of 10 studies to support its claims. Assuming the study populations to be unique in each case (and this is not a given since several of the studies are by the same research teams and may have involved different tests on the same athletes), the total number of people studied is 98. All of these are highly trained and/or very fit athletes whose lifestyles and needs are greatly different from the average office worker or student. In this narrow population an isotonic drink does give some edge in performance.

Such results are not terribly surprising. Lucozade Sport Caffeine Boost contains a mixture of glucose and caffeine – over the short term it acts as a kind of biological rocket fuel, providing energy in an easily assimilable form and a jump-start to your adrenal glands. The longer-term implications of using a sugary drink for quick energy, however, are worrying.

The brain and muscles prefer glucose for energy because it can be used immediately. But to get the best from your body (or brain) that glucose needs to be supplied in a slow, steady process (from the breakdown of complex carbohydrates, for instance). Large infusions of simple sugars can have a dramatic effect on insulin levels and lead to depression and anxiety. They also wreak havoc on the immune system. Studies show that the body's

Sources

Space restrictions prohibit full referencing, however Behind the Label draws on data from published studies and reports in medical, scientific and trade journals, government-sponsored databases (e.g. the US National Library of Medicine) and relevant Material Safety Data Sheets (MSDS).

immune response is dulled almost immediately after ingesting simple sugars.

For most of us, the likelihood that Lucozade Sport makes the sprint to the bus stop or the newsagents that much more effective is simply ridiculous. Instead, it adds to our daily diets more calories, caffeine, sugar and artificial sweeteners – and of course there are adverse health consequences to this.

Consider first the nonsense of an 'energy drink' that contains artificial sweeteners – which of course provide no energy. These ingredients serve no useful function for the body and are not included to reduce the caloric value of the drink. In this instance, toxic sweeteners like aspartame and acesulfame K are most likely used as flavourings – something that is becoming more and more common in the soft drinks market.

Caffeine is also not an energy provider. It is a central nervous system stimulant drug that produces mild positive mood changes. At doses of around 100mg daily (around three servings of cola soft drink) caffeine has been shown to produce physical dependence characterised by lethargy and headache on cessation of intake. Caffeine also leeches nutrients from the body. Consumption has been shown to reduce the body's ability to absorb iron, so the idea of giving it to young children (who have an increased need for iron in order to maintain growth and immunity) seems worrying. And although Lucozade Sport Caffeine Boost contains 'energy-releasing' B vitamins, research has shown that caffeine leeches B vitamins from the body – potentially rendering pointless the minute amounts of niacin, pantothenic acid, B6 and B12 in the mix. Not all products in the Lucozade Sport range contain caffeine, but this one does: 80mg per bottle, similar to the amount found in a can of Red Bull or a large mug of instant coffee.

Caffeine ingestion can make the body's response to glucose ingestion more acute. There is data to show that caffeine consumption can increase the severity of hypoglycemic symptoms. Drinkers of caffeinated beverages also have an increased risk of colon cancer.

Energy drinks can make a valid contribution to the performance of sportspeople who train at the very highest level. For those who go to the gym twice a week, however, the benefit is negligible. For children the effect of such drinks can be devastating, giving them a quick boost followed by a deep low. E

Glucose syrup

Purpose: Sweetener, texturiser, emulsifier

Adverse effects: Glucose syrup is generally known as corn syrup outside the US and Canada. The health effects of consuming glucose are not dissimilar to those of other simple sugars. Glucose syrup is implicated in dental caries and, in large quantities, contributes to obesity. It has no nutritional value and can cause acute rises in blood glucose levels, thus stimulating an acute rise in blood insulin concentrations. This may be linked to a raised risk of diabetes. High sugar diets leech essential minerals such as copper, chromium and zinc from the body, leading to deficiency diseases and immune system impairment.

Maltodextrin

Purpose: Sweetener

Adverse effects: Can be made from starchy foods including corn, potato, rice, arrowroot, tapioca and/or wheat. Dextrins occur naturally in the human gastrointestinal tract as a stage in the digestion of starch. But the dextrins in food are made in the lab. Major concern is that the starting material may be GM corn.

Aspartame

Purpose: Sweetener

Adverse effects: Breaks down easily in heat and during storage to its neurotoxic components: phenylalanine, aspartic acid and methyl alcohol. According to the US Food and Drug Administration, aspartame is associated with headache, dizziness, loss of balance, mood swings, nausea, memory loss, muscle weakness, blurred vision, fatigue, weakness, skin rashes and joint and musculoskeletal pain (for a full report on aspartame toxicity see the *Ecologist* September 2005). Recent evidence shows that aspartame ingested at levels currently found in daily soft drink consumption raises the risk of otherwise rare brain tumours known as lymphomas.

Acesulfame K

Purpose: Sweetener

Adverse effects: Causes cancer in animals. Acetoacetamide, a breakdown product, has been shown to affect the thyroid in rats, rabbits and dogs. Although commonly blended with aspartame to cover its bitter aftertaste, there are no studies to show that the combination is safe or whether it produces other toxic byproducts.

Acacia Gum

Purpose: Stabiliser

Adverse effects: Also known as Gum Arabic and E414. Acacia gum is generally considered a safe food additive. It has been used in printing as an off-set agent, however, and workers exposed to its fumes have suffered allergic reactions, sometimes called 'printer's asthma'.

Glycerol esters of wood rosins

Purpose: Stabiliser

Adverse effects: Obtained by solvent extraction of pure stump wood (wood resin). In short- and long-term studies on rats, low-level consumption showed no effects; higher levels showed changes in liver size, however, and in some cases the dose was fatal. Also used as a plasticising agent in chewing gum and in citrus oils added to beverages to increase the density of the oil. High intakes may upset the calcium/phosphate equilibrium and cause headaches, nausea, vomiting, dehydration, diarrhoea, thirst, dizziness and mental confusion.

Flavourings

Purpose: Synthetic flavours

Adverse effects: Flavourings can be a mix of several synthetic chemicals. Essentially the same chemicals as perfumes, they can thus be considered neurotoxins, allergens and potential carcinogens.

Caffeine

Purpose: Flavouring

Adverse effects: A stimulant, psychoactive compound that can provoke mood changes, lethargy and headaches. Caffeine is addictive and ingestion of high levels can cause miscarriage as well as contribute to peptic ulcers and heart ailments. At the levels added to soft drinks caffeine adds virtually no flavour but does, if consumed regularly, trigger caffeine addiction. Children consuming caffeine have more, illnesses, headaches, sleep problems and iron depletion.

END OF THE WORLD

Listening to the Earth

Mesmeric Yaqui leader Chief Sonne Reyna explains to **Nicola Graydon** why heeding nature is the only way to break free from our artificial cultures and the gridlock of greed

It comes as no surprise to learn that Chief Sonne Reyna was raised by 'tornado shamans' able to control the weather. He's a force of nature, with a face as fissured and craggy as an Arizona rock-face and a laugh so loud and broad you can see his tonsils dancing in the back of this throat.

We're sitting in La Poblanita, a Mexican restaurant in the tiny California mission town of San Juan Bautista, on the second day of the New Year, talking about the profound transformation that's needed if we're to survive the Earth changes threatening to overthrow humanity's hegemony of the planet. But first he insists we order the special enchilada de mole – 'the best north and south of the border' – and asks us to create a 'spirit plate' as an offering to the ancestors.

With coal-black hair snaking down his back, Chief Reyna, 58, looks like an Indian but talks like a preacher, in long, graceful passages with repeated phrases and musical cadences. He's mesmeric to listen to and regularly drifts into a passionate paean to the earth.

Our only hope is to reconnect with the natural world, he says. Slowly we will all understand that and, when we do, nature will be there waiting for us.

'Nature instantly reconciles,' he insists. 'There's no negotiation. All the cultures of magic understand that; all the tribes of magic employ that understanding and flow with it. Now we are in a gridlock of stupidity; a gridlock of greed; a gridlock of war. All for one reason only: because we are the only animal dumb enough to separate itself from nature.

'We have gone too far and Mother Nature is moving to the last resort,' he warns. 'The prophecies are dire and this is not the first time. She has done this four times already in the past 100,000 years. It's recorded in our legends that each time human beings disconnected themselves from the earth, as they turn toward material greed, this sows the seeds of their destruction. Here we are again: in Act V of another 26,000-year cycle. Our world is a dream from the Sun, so we are part of galactic seasons. So some earth changes are cyclical, but we help to create, to amplify or to mitigate those changes.'

For Chief Reyna, the 'last resort' includes prophecies of a comet hitting the Pacific Ocean off San Francisco creating a devastating tsunami; the eruption of the volcano in Yellowstone National Park and earthquakes around the world as 'Mother Earth shakes this annoying insect off her skin'. Thankfully, however, the Chief is betting on a best-case scenario: the return of love to the human heart.

'Nature is absolute, nature is permanence, nature is love,' he says, 'and love is coming to reclaim us. But love can come the hard way – on its own terms – or in collaboration with us.'

According to him, 2008 is a pivotal year in the countdown to 2012, the beginning of a shift in global consciousness. 'The visions say 2008 is the year of miracles because people are starving for reconnection; they are starving for the truth from nature.'

According to him, we are all descendants of 'tribes of magic' – indigenous peoples who understood the natural and supernatural worlds – and we have the potential to rediscover that heritage now. Chief Reyna claims 2012 will mark not so much the end of the world (as prophesied by some) but the 'end of artificial culture', as human beings reconnect with the natural world. 'We don't belong to no religions, we don't belong to no corporations, we don't belong to countries, we don't belong to anything from the artificial culture that claims ownership over us. We belong to the sky, to the earth, to the oceans.'

Chief Reyna has travelled far from his original Yaqui village in South Texas and his journey within and without artificial culture has not been an easy path. A Vietnam veteran, he became a militant Indian leader in the 1970s and worked in government during the Carter administration. In the US, Native American Indians continue to be treated like second-class citizens. Chief Reyna prefers to live off the reservation on his own terms, but has never veered far from the tribal protocols that honour Mestaquepeyako – literally 'grandfather' or 'grandmother' – in all things.

The Yaqui people, named after the river that runs through their original home in the Sonora desert, still practise earth rituals to honour nature and maintain balance. Made famous by Carlos Castenada's seminal work *The Teachings of Don Juan*, the Yaqui see no separation between humans, non-humans, the earth, the sky, the sea and plant life.

Undefeated as a nation, despite brutal battles at the hands of the Mexican and US governments, they nonetheless had a mutually beneficial relationship with the Jesuits, which resulted in a syncretic belief system that combines pagan and Catholic rites. At the heart of Yaqui religious practice are the yearly deer dances performed at Easter as both a celebration of the fertility of spring and

Illustration ANNA GARFORTH

the Resurrection. Central to everything is a profound humility and reverence for nature.

'Mother Nature is the original living Holy Bible,' says Chief Reyna. 'All our lessons are here. All the creatures of the earth are tenured professors in this university. The true masters and gurus are the standing people – the trees – the whales, the birds and the insects under our feet.

'The earth never stopped talking to us. We stopped listening, and it's time to open our ears again. Become like an ant: be humble. The protocol is to give, to make an offering of gratitude and then ask for what you need. The problem with artificial culture is that it takes, takes, takes.'

By now, the restaurant has cleared and the tables have been made up for dinner. The watery winter light is falling into dusk. Chief Reyna wants to take us to the mission to bring our 'spirit plate' as an offering to Ascension Solorsano de Cervantes, the last fluent native speaker, a healer, to have lived in San Juan.

It is somehow fitting that Chief Reyna found himself here. San Juan was built over the Mutsun tribal village of Popelouchum; the mission, built with native labour from all over California, sits over Mutsun sacred grounds. Some 4,000 workers, who once converted were forced to stay, are buried in the cemetery. Chief Reyna has done innumerable ceremonies to heal the dead.

'We are all the descendants of one genocide or another,' he muses as we walk through the mission gardens. 'We need to heal that history. America needs to summon her courage and begin with the healing of America first. Everywhere you walk in the land of America, the land is still wet from the blood of dead Indians – because it happened yesterday. This lies like a curse over this land. Part of the liberation of the human race is to acknowledge and reconcile the holocaust on every land. We need to summon our spiritual courage and heal the holocausts of the human race – past and present. It begins with forgiveness – there is no other way.'

According to Chief Reyna, current Earth changes are part of a galactic cycle that human beings have exacerbated – but that we can also mitigate.

> 'The earth never stopped talking to us. We stopped listening, and it's time to open our ears again. Become like an ant: be humble'

'Global warming is only the tip of the emerging iceberg of natural Earth changes,' he says. 'With sincere meditation and prayer we mitigate – we calm down – the tsunamis that are coming to humble us; the earthquakes and volcanos that are coming to humble us. We deflect the comet that is coming to humble us; we heal and avert the horrible plagues that are coming to humble us. We offer the healing of pre-emptive reconciliation to these natural powers and forces – some man-made – coming to humble all of us.' Like a wilful prodigal, mankind will, he insists, find a way to return to the love of the Mother creating all manner of miracles.

The Chief is creating a number of events, ceremonies and rituals to facilitate what he sees as the human regenesis in the emerging consciousness of the sixth world. The first, the Tsuname of Love, is a multi-mass-media event that aims to feed the children of the world.

'Tribal culture measures wealth according to the health and happiness of our children,' says Chief Reyna. 'Inside the holiness of nature, children are first. But artificial culture has created a situation where too many children are starving*. How can anyone sleep knowing so many children are dying of hunger?' This event will, he says, ignite the compassion of the world and everything else will follow.

'We are entering a period of rebirth now. Our only enemy is distraction. We are the only animal that works more than it loves itself, that worries more than loving. We need to love ourselves, heal each other and love the earth. Then we can rebirth humanity.' E

Chief Sonne Reyna is a descendant of the Yaqui-Coahuilteka Nations and Sun Dance Society Peace Chief, an Ambassador for the Natural World who shares ceremonies to reconnect global humanity with nature

**Every year 15 million children die of hunger which means that every day, 42,000 children die from hunger-related causes – one child every five seconds. 160 million children are malnourished. One out of every eight children in the US go to bed hungry every night. (Sources: www.bread.org; www.thinkquest.org; UN Food and Agriculture Organization)*

Bestia non grata?

The EU Habitats Directive is calling for greater biodiversity, but Europe's conservation campaigners are finding that when it comes to the reintroduction of large carnivores and other wild animals maligned by local rural populations, emotions run deep. Nick Kettles tracks a beast of an issue

From Catalonia in the South, through the Ariège and Béarn, to the Basque country in the North, both locals and tourists are used to seeing Nationalist slogans daubed in white paint on Pyrenean mountain roads. But now a new clarion call is vying for their attention: *Non Ours* (no bears) and *Mort aux Ours* (death to the bears.)

The bears in question are (or were – see box, page 25) five Slovenian bears – one male and four females – released in 2006 after the last native female brown bear, Canelle, was shot by a hunter two years earlier. Her death in 2004 meant less than 20 bears remained in the entire 200-mile mountain range, and prompted the French government to pledge to double the population.

The slogan-painters in question are a group of local farmers who accuse the omnivorous bears of attacking livestock as an alternative food source. They continue fiercely to campaign against further reintroductions. One anti-bear farmer told the Associated Press: 'This is shameful. War has been declared.'

The battle between the conservationists and farmers has not been pretty. Twelve pots of glass-laden honey, labelled *Caution: Anti-Bear Poison* were found by a hiker shortly after the first release. A pro-bear local mayor was taken hostage by protesters who laid waste to his village hall and later issued death threats against him.

One local professional who helped in the re-introduction of the animals has been physically threatened and had a dead sheep dumped on the doorstep of the family home. A local conservation group experienced the same.

But since the reintroduction of the bear, estimated figures of livestock killed only amount to a few hundred each year, which, out of more than half a million sheep region-wide, amounts to less than 0.01 per cent.

A thorough public consultation was first undertaken and, under the terms of the reintroduction, farmers are well compensated for any losses. According to AVES (Association de Protection des Espèces Menacées), whenever a herder claims a lamb, kid or calf has been killed by a bear, the government gives him the benefit of the doubt and still pays the indemnity – even if the young animal might have been taken by a dog.

Farmers have been aided with funds to pay for shepherds and to purchase 'patous' – anti-bear guard dogs of the Great Pyrenees breed, which were used widely in the region before the demise of the bear at the beginning of the 20th century. Local pro-bear activists have even paid for helicopters to take farmers to altitudes where livestock is usually left unattended to graze in summer months (again, only since the demise of the bear).

Bears as scapegoats

So, given this level of support, what exactly has drawn the ire of farmers so forcefully?

Sylvie Cardona, secretary general of AVES, believes farmers are sensitive because of the difficulty the industry is facing. 'French (sheep) farmers are in competition with farmers in other countries (like New Zealand). They have economic problems, and they're putting the blame on the bears.'

Although France receives more subsidies than any other EU state, the majority of these go to large cereal farms and agribusiness. With unemployment high, many French youths leave rural areas for more lucrative city jobs, leaving fewer people to take over the farms when older farmers die. It's true that since 1999, more than two million people have relocated to the countryside, but most are city people, and ex-pats from Holland, Germany and the UK looking for a slice of 'la vie tranquille'. All of which significantly undermines 'attachement au terroir' – the strong sense of belonging – that the rural population feels for the land.

It's not unusual for rural lobby groups, especially those under economic pressure, to exaggerate the threat of wildlife, whether native or reintroduced, and make them a scapegoat for other problems.

In the UK we hear the same high emotions from farmers who claim that badgers are spreading tuberculosis among cattle and destroying the industry. This in spite of research suggesting the main vector of bovine TB is cattle infecting cattle – and possibly infecting badgers too.

When the beaver's reintroduction to the Highlands was proposed some years ago, Robin Malcolm, who owns a 5,000-acre estate adjacent to one of the proposed trial sites said: 'Beavers are a destructive pest and that's why they were killed 400 years ago. They are destructive to agriculture, forestry, and fisheries. This is... the imposition of an alien species.'

Among farmers facing the threat of illegally released wild boar on the edge of Dartmoor, one claimed: 'If we don't get these pigs sorted out when we start lambing it could be devastating. With the amount of lambs we would lose there would be no income at all.'

The same story is repeated in Scotland, where multi-millionaire Paul Lister, owner of the Alladale estate in the Highlands, wants to reintroduce ancient British animals including grey wolves, boar, brown bears, lynx, beaver and elk into an enclosed 're-wilding' reserve. 'McSerengeti', as it has been nicknamed, will eventually spread over 250 square kilometres – bigger than the city of Glasgow.

In spite of reassurances that fences will be secure, the animals tagged and compensation paid for livestock losses, as well as that the estate will be an economic force for good in the local community, the local response has been mixed.

At an early public meeting a picture of a man who had been mauled by a bear was passed around. Naturally, the National Farmers Union fears the possibility of wolves attacking sheep. Locals and the Ramblers' Association Scotland have also raised concerns about the risk to the public.

Atavistic fears

Considering the infinitesimally small numbers of livestock lost in the Pyrenees where there are no enclosures, and how small the risk of an attack on a human is – you're more likely to be killed by a domestic dog than a wolf, and 374 times more likely to be killed by lightning than by a bear – it's reasonable to wonder where else these fears come from. Obviously change doesn't come easily to people who have become used to a particular way of life over long periods of time, but local history, myth and folklore certainly plays a part.

In the 19th century, the Pyrenees was the home of bear-taming. The 'montreur d'ours' was a primary cause of the bear population's decline, because hunters would kill the mothers in order to get their cubs.

The Pyrenees is also rich in bear folklore, evoking a time when 'wild beasts' were more numerous and attacked the herds and their shepherds. One village festival near Perpignan celebrates the rescue of a young maiden kidnapped by a bear, and shaving its fur returns it to a more human form. It has been a long time since the local population lived at peace with the bear.

John Linnell of the Large Carnivore Initiative for Europe (LCIE) says in many cases carnivores can become symbolic of a range of wider conflicts, for example those between urban and rural, or traditional and modern, values. When two Slovenian bears were reintroduced to the Pyrenean Ariège region in the 1990s, they came to symbolise the deep distrust with which the fiercely independent 'Ariègeois', like many in the south-west, view any scheme, however well-intentioned, imposed by the government in Paris.

It doesn't help, too, that we use animals, including the bear, as metaphors to describe a range of moral positions and experiences in everyday speech. For example: 'Investors, mauled by a bear market, come clawing after their brokers.' As Adrian Franklin, author of *Animals and Modern Cultures*, points out, other metaphoric terms commonly used to describe unwanted species include: invasive, threatening, stealing, noxious, infestive, virulent, deadly and detestable, all of which derive their meanings from the realms of war, disease or theft.

Sometimes, says Stephan Harding, author of *Animate Earth: Science, Intuition and Gaia*, these are views reinforced by television.

'There is a neo-Darwinist narrative evident in many popular TV wildlife programmes, which emphasises the competitive aspect of nature,' he says, 'and yet you could edit the

Top: research suggests badgers don't spread TB
Middle: beaver dams can control watercourses
Bottom: wild boar root out heavy vegetation

A complexity of habitats

European Union Council Directive 92/43/EEC – the Habitats Directive for short – is designed to promote the maintenance of biodiversity and promote the reintroduction of native species including Europe's large carnivores: the bear, wolf, wolverine and lynx.

However, while its objective is lofty, its fulfilment is by no means straightforward. As John Linnell of LCIE points out, there is no wilderness left in Europe. 'There are many areas of semi-natural habitat, often with high conservation values, but no large areas where carnivores can roam without coming into contact with humans.

'In their absence we have forgotten how to share our living space with potentially dangerous large animals. When large carnivores return, we have to readapt the way we keep livestock. Europe is also home to five million hunters. To be successful we must be supported by the people who live in Europe's wilder nature-rich areas.'

But it's not easy to please everyone. For example, while the Eurasian lynx population is healthier, the Iberian lynx is perilously close to extinction, with only 150 left on the Spanish peninsula. Decimated by a declining population of rabbits, which make up 90 per cent of its diet, its natural habitat was threatened by an EU-funded road-building project. Female lynx will not reproduce until they have their own territory.

But common sense is now prevailing. Spanish authorities have scrapped the plans, recognising that they menaced other species including the imperial eagle, Iberian wolf and black stork.

same footage differently to show the amazing co-operation self-evident in the wild, and therefore offer a more balanced view.'

Author George Monbiot suggests these atavistic fears have their source in a mindset that offers a view of the land fundamentally opposed to the idea of greater biodiversity:

'It's a human tendency to stamp out anything that might represent competition or a threat to our authority,' he says. 'It emerges from the same emotional spectrum as the genocide perpetrated by colonialists seeking to create a blank slate upon which they could build their empires. This subject cuts to the very heart of our humanity. In part this is an illusory desire for control and mastery over the ecosystem, which ultimately is impossible, although – evidently – you can create an illusion or idea of control by killing off and eliminating wild animals, even if it's not conclusively proven there is a threat.'

Clearly we have never been very good at sharing our space with 'others'.

This view of a 'wild' that must be contained and controlled, is not representative of all farmers, landowners and rural interest groups, but it can inform inflammatory headlines – such as *Psycho bear tears apart eco-idyll* – and therefore discourage rational debate. Moreover, it can divert our attention away from more important issues like understanding how climate change affects the chances of ecosystems adapting naturally.

As the Intergovernmental Panel on Climate Change points out, without intervention the resilience of many ecosystems is likely to be exceeded by the continuing impact of climate change and other influences on global change, especially changes in land use and overexploitation. If this happens the structure and biodiversity of most ecosystems will be disturbed and compromise the services (natural, cultural, spiritual, recreational and aesthetic) they currently provide.

It's a vicious cycle. Population growth, market-driven urbanisation, intensive farming – all further consequences of industrialisation – have impacted native habitats and the species they support, and further reduced climatic stability, by upsetting the delicate balance of the intake and outtake of carbon dioxide.

Finding harmony

It's false to think that the reintroduction of animals to their native habitats is being done for sentimental reasons only, a restoration ecology that wants to return nature to a pristine condition.

The reintroduction of animals such as the bear invite us to consider how the conservation of natural habitats and the ecosystems they support can help us respond to climate change, and yet to do this we must first reconsider the fundamental question: 'Who or what is nature for?' Is it just for us? Or do other species have equal rights to exist and flourish?

The bear offers a unique perspective, because as a large mammal, not unlike us, it needs lots of room to roam (sometimes over 200km). When we clash with wild animals, whether reintroduced, or still clinging to what remains of their native habitat, might we not ask 'have we been too greedy in our desire to control and rule over all we survey?'

This is not to suggest we leave nature to re-find its balance without our intervention – it is too late for that. According to Diane Walkington, head of species programme at WWF UK, choices and priorities must be made, and we must accept that we may lose some animals. There is not enough time or money to save all of them. Ecological importance must be a prime consideration in making our choices, not just cultural significance, charisma or appeal.

But, according to Hugh Fullerton-Smith, Alladale Reserve Manager, once choices are made, we need better education about the true risks an animal might pose and the central role it plays in helping manage the land and improve biodiversity. 'It's a process that takes time to communicate', he says. 'You have to appeal to people's love of nature and explain why what you are doing will be good for conservation, as well as making it more beautiful. For example, our wild boar will root out the vast swathes of heather and bracken that not only prevent the natural regeneration of other flora and fauna, but also provide a natural habitat for the ticks that cause Lyme disease.'

The Scottish Wildlife Trust and the Royal Zoological Society of Scotland believe wolves will improve the ecosystem by reducing the

red deer population, currently estimated to be over 500,000 animals, close to the land's natural 'carrying capacity'. This would reduce the need for expensive culling and, experts believe, result in a marked increase in plant and birdlife biodiversity.

Derek Gow, a specialist in wetland mammal conservation, says beavers are integral not only in improving wetland ecosystems that currently rely on human intervention, but also in breaking Britain's boom-or-bust water strategy.

'We have massively bodged water management by draining wetlands, bogs and the like to make sure the land holds as little water as possible for agriculture,' he says. 'We've straightened rivers and streams to turn them into drains, and the net result is we have either too much in the winter or none at all in the spring or summer. We need to put sponges back into the landscape and beavers would do this for us.'

Although not immediately obvious, the bear is also integral to maintaining biodiversity. Known as an umbrella or keystone species, in protecting the bear we also protect a large number of other species that depend on the same habitat. The roles it plays are similar to those of the boar, but it also 'recycles' cadavers through eating them – including, in spring, those animals killed by avalanches in the winter – and distributes through its faeces the seeds of the plants and berries it eats (not unlike the way birds do).

Our sense of vulnerability

The way we see animals has an integral effect on the way we frame our relationship with them. From the menageries of the 19th century, where we viewed animals as the monstrous other, via zoos, safari parks and of course television, our interest in wild, exotic animals has developed progressively from one of idle curiosity to genuine concern. Yet in all these situations, we are still removed from the wild, whether behind zoo bars, the windscreen of a Land Rover or a television screen. There is no opportunity for reciprocal encounters, where we may really face our sense of vulnerability about the wild.

Living cheek by jowl with 'the wild' also brings us up against some tough questions. If we live in a world where all species have a right to exist and flourish, would this include other animals we find it less easy to love, like the much-maligned feral cat (Rome, for instance, has more than 250,000 of these animals)? Urban householders may say no, but anti-vivisectionist group PETA would say yes.

In the case of large carnivores, John Linnell says it's simply a matter of changing the way we think: 'People will need to accept the right of these species to exist, and be willing to share space in the landscape and a part of nature's productivity with them. People need to be willing to live with something slightly wild close to their homes. Large carnivores have repeatedly shown their ability to live with us humans – we just need to find a way to live with them.' E

> 'Who or what is nature for? Is it just for us? Or do other species have rights to exist and flourish?'

Image: GETTY IMAGES

The Death of Franska

In April 2006, Palouma and Franska were the first of four female Slovenian bears to arrive in the Pyrenees, to boost the exclusively male population of 18. A further two females, Hvala and Balou, and a male Sarousse, were to arrive shortly after. Due to the general movements of the bears (fitted with tracking devices) being made public, however, local farmers were soon able to single out Franska as having been responsible for the death of a number of sheep (the Pyrenees National Park claimed she was responsible for more than half of the 95 attacks carried out throughout 2006). Franska quickly became the focal point of the anti-bear protest, and with every dead sheep found, the campaign to have her removed intensified.

Countdown

April 2006: Franska, thought to be six years old, is released in the Hautes-Pyrénées, equipped with tracking devices.

May 2006: Franska is located by anti-bear protesters and driven back by 'startling trackings' – the beating of the undergrowth with sticks, shouting and bell ringing. Appearance of anti-bears slogans such as: *Let us return the skin of the bear to show we have killed him.*

July/August 2006: After sheep are killed, further 'startling trackings' are carried out.

Winter 2006/2007: Franska hibernates.

April-July 2007: Franska's killing spree resumes. She is spotted close to villages, raising fears of an attack on people.

July 2007: The Environment Ministry admits it was misled about Franska, who is not a fertile seven years old, but more probably a 'menopausal' 17, which might explain her serial slaughter of sheep for fun.

July 9 2007: Seventy stockbreeders take to the mountain, some with rifles – officially a 'bear hunt.' Franska is seen in the lower hills and stockbreeders push her back with detonator blows towards the motorway.

12 July 2007: Further 'startling trackings'.

26 July 2007: The French Environment Secretary calls upon independent specialists for further advice before deciding whether to withdraw Franska. Experts suggest the hounding of Franska may have influenced her carnage.

August 9, 2007: Franska is killed by two cars close to Lourdes. The autopsy also reveals the presence in her body of small-gauge lead pellets.

September 2007: A month after Franska is killed, and a year after the death of Palouma, who accidentally fell from a cliff, two cubs born earlier in the year to another of the reintroduced bears, Hvala, are named Pollen and Bamboo, as a symbol of the continued growth of the bear population in France.

The other campaign trail...

Are you eager to lend your voice and support to the campaigns that really matter to you? The following websites and contacts should help you kickstart a true political process. By **Alex Thursby**, **Nick Wilsdon** and **Russell Scott**

Between the frustration of the General Election that never was and the ongoing drama of the US elections, perhaps you have developed an appetite for political action that needs to be satisfied? So how about embarking on a personal campaign trail of your own? As political parties of all hues try to apply flecks of green to their policies, ordinary people are making a real difference in their homes and communities without waiting for politicians to sort out the mess. Gazing at the television and wondering what the various candidates can do for the world, it can be easy to forget that the future is also in our hands.

There are any number of worthy ideas and campaigns to inspire individual action on all fronts. From airport protests to downshifting, creating living roofs to building cycle paths, participating in one of these unique campaigns can make a real difference. The turn of the new year was never the best time to make a resolution. Instead take your lead from nature and make spring the time to engage with something new.

Now is the time to get active and spread the message. It will do a world of good.

Avaaz

www.avaaz.org

A fresh website with provocative and engaging material from an organisation barely a year old. Avaaz, which translates as 'voice' in various languages, aims to give you just that. With over a million members, the site provides lucid descriptions of current global issues then encourages you to sign a petition. Involvement goes beyond e-activism, allowing you to volunteer to help with research, translation or direct action, inspiring examples of which are detailed in the blogs section. Effective use of new media makes the content easily accessible. We recommend its 'Stop the Clash' piece.

AVAAZ.ORG

Campaign for the Protection of Rural England

www.cpre.org.uk

'A backward step in planning' is how many organisations are describing the Government's current planning white paper. Taking forward Kate Barker and Rod Eddington's proposals for reform of major infrastructure planning, the white paper is now approaching its final reading in the Commons. With the potential to exclude the public from the consultation process and tip the scales in favour of economic development, the Bill could see nuclear power stations 'streamlined' into existence – helping along the Government's pro-nuclear stance. CPRE urges you to join its network of letter-writers to campaign against attempts to make the Bill law before Parliament's summer recess.

Campaign to Protect Rural England

Freecycle

www.uk.freecycle.org

The 'superfood' of positive actions, this one ticks multiple boxes, is easy to do and rewarding. Freecycling began in the US and is spreading across the globe at pace: join more than one million others in the UK who are gifting their unwanted possessions to someone nearby and getting what they need for free. Sign up to your local group or start one online to reduce landfill waste and resource consumption, enjoy a tidier house, admire your new desk/cricket set/cutlery/laptop and make links within the community.

Green Dragon Books

www.greendragonwoods.org.uk

Aiming to turn words into woods this workers' co-operative sells second-hand books to regenerate British woodland habitat and support sustainable land projects. Books are also donated to educational projects or recycled. A symbiotic relationship with nature is promoted through educational projects such as the 'Trees from seeds' scheme, which helps schools and community groups get tree nurseries going in their area. Volunteers can help with planting trees and hedgerows or working in nurseries.

GREEN DRAGON
TURNING WORDS INTO WOODS

Livingroofs

www.livingroofs.org

The living roof renaissance has arrived in the UK – and not before time. Benefits include improved insulation, drainage, biodiversity and roof longevity, not to mention more green space. Long popular in Europe, their use is increasing here with the help of resources like this information- and advice-loaded website. Get inspiration from the homes, schools, business centres and bus shelters that have led the way, find practical tips and sign the online petition for the Government to adopt green roof policies. London hosts a World Green Roofs conference in September.

LivingRoofs

Compassion in World Farming

www.ciwf.org.uk

Michael Sutcliffe died in 2007 at the age of 83, having devoted his retirement to campaigning for Compassion in World Farming. Perhaps you could help carry on his commitment and zeal? This organisation is running four campaigns to bring about change in farming practices. Broiler meat, egg-laying hens, live export and eating less meat are all covered, as are all the opportunities to take action. Whether you want to add your weight through online petitions or take up the opportunity to become a Compassionate Campaigner, by attending demonstrations, participating in media stunts or collecting petition signatures, here's how to help bring about change in modern farming practices.

COMPASSION in world farming
ciwf.org

Action on Additives

www.actiononadditives.com

Food colourings and preservatives are about appearance and shelf-life, not nutrition, while research has shown some mixtures increase hyperactivity in susceptible children. Action on Additives is compiling an excellent online register of products containing the seven offending items – know what you and your family are consuming. Hospitality workers can confidentially blow the whistle on their use in industry kitchens too.

Action on additives

Mast Sanity

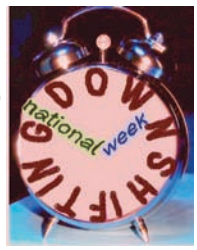
www.mastsanity.org

Mobile phone and Tetra masts have shot up all over the country, often with no planning consent or consultation, and local communities are paying for it with their health. Mast Sanity is providing a huge store of information, research, advice and practical tools for those affected to campaign against the installation – or, where it is too late, for the removal – of the Trojan Horses of our time. Planning law, strategies for action, briefings – the site has it covered, and incorporates an excellent forum facilitating links and support between campaigns. If your community is suffering, make a noise.

MAST SANITY

National Downshifting Week

www.downshiftingweek.com



With a simple concept and inspiring resources, this website will help motivate even the most inertia-laden mind. Tracey Smith has embarked on a journey to 'Slow down and Green up', and from 17 to 21 April she is inviting you to join her. In a world that is making so many demands of us, downshifting is something inherently activist. This website provides a manifesto to guide you through your new commitments to buy less and reclaim time, while the free e-book explores the wider concepts of downshifting. There are three sections covering individuals, companies and schools/children, so everyone can get involved. Don't miss the chance to add your name to the petition calling for lessons on sustainable living in schools.

Plastic Bag Free

www.plasticbagfree.com

Modbury in Devon has done it. Other villages and towns are going to do it. Look at this site for inspirational routes to ridding your area of the dratted plastic bag. With plastic bags a major pollutant of our oceans, threatening wildlife and filling landfill sites, this campaign has been inspiring people up and down the country. Telling you why this village went plastic bag-free and how its inhabitants did it, the site has excellent links to local campaigns, plastic facts and ecological alternatives to plastic bags.

Surfers Against Sewage

www.sas.org.uk

SAS campaign for clean and safe recreational waters free of toxic chemicals, nuclear waste, marine litter and contaminated sewage. Recent campaigns include 'return to offender', 'no butts on the beach', 'think before you flush' and the awarding of the golden loo brush to Northern Water. This award-winning website has information on the link between sewage and sickness, facts about the water industry and how to enjoy the sea safely. Adopt a beach, report local pollution, take part in fundraising or take action.

Rising Tide

www.risingtide.org.uk

A network for those committed to getting in the face of those responsible for climate change through direct action. Recent pranks have involved a die-in at the Tate Britain, a rooftop occupation of Newquay airport and polar bears entering BBC Bristol to complain about its link to BP. The website has downloadable films, info sheets, flyers and links to local groups.

Plane Stupid

www.planestupid.com

Plane Stupid is committed to stopping the madness of cheap flights with campaigns against the expansion of Heathrow, Stansted and smaller airports across the country. Aviation is massively subsidised and the fastest-growing cause of climate change in the UK, but still the Government plans the largest airport expansion in UK history. Get involved with this website.

Tree for All

www.treeforall.org.uk

The Woodland Trust's Tree For All campaign aims to involve one million children in planting 12 million trees around the UK over five years. As well as clear benefits to the environment, kids will connect with – and learn to care about – green life, preparing them to be its future guardians. Over four and a half million trees have been planted to date and there are plenty of ways to get involved in the two years remaining. Give it a plug to children, schools, youth groups, companies and landowners near you.

Walk to School

www.walktoschool.co.uk

More than 50 per cent of children in the UK don't, but Walk to School wants to get more kids doing just that: it's great for their health and can reduce car use. This campaign provides useful ideas for overcoming common barriers, such as safety (parents walk too) and distance (walking part of the way), and works with schools to take the lead. Show support by getting the young ones – they needn't necessarily be yours! – moving. Walk to School Week is 19-23 May (12-16 May in Scotland).

This is Me Reporting

www.thisismereporting.com

Say you made the news by making your own news – why not highlight your efforts to bring about change by creating and uploading your own story? Thisismereporting.com was set up to combat the one-sided journalism we are often exposed to. It allows people to upload their own footage of news affecting them or clips they think people should see. It is a great example of the impact that a grassroots initiative can have. Starting on a computer in a hallway, the site has grown from 100 users a week to 50,000 individual visitors per month, purely by word of mouth.

Sustrans

www.sustrans.org.uk

A sustainable transport charity that completed its first cycle path along the canal from Bath to Bristol in 1984. Since then it has pioneered the National Cycle Network, which is over 10,000 miles long and runs within one mile of 50 per cent of the UK's residents. Sustrans works with policy-makers to promote cycling, and runs campaigns such as the 'Safe routes to school' and 'Bike it' to engage with young people. Volunteers can help out by building cycle routes and walking paths throughout the UK.

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THE DEATH OF FOOD AS WE KNOW IT

Climate change and peak oil are set to change what's on the world's menu for ever. This *Ecologist* special offers a glimpse of the future of our food

When it comes to food we take so much for granted. We expect it to be cheap. We expect it to be plentiful. But we are now entering an era when we can't take such things for granted. Food prices are rising. As our climate changes, crops are failing and yields falling. Scarcity is becoming a common headline.

Decades of plenty have worked against us. Not only have many of us lost our basic knowledge of food origins – that chops come from lambs and pigs, for instance, or burgers from cows – we've also lost sight of the massive resources that go into bringing a meal to our tables. Who produces it? What chemicals go into it? How far has it flown from farm to fork? Even if you are a meticulous label-reader you won't find this basic information on any pack.

For years, experts behind the scenes have been asking the challenging question: what will we eat when the crises of climate change and peak oil finally converge? Those who make the weekly trek to the supermarket are rarely encouraged to make the link between these globally significant events and the end of our globalised food supply. Where will tea, coffee, chocolate and bananas – as well as out-of-season salad vegetables, cheap organic beef and fresh orange juice – come from when there is no oil to make fertilisers and pesticides and to transport them?

This *Ecologist* special brings together an extraordinary collection of writers and experts who have been chasing down the answers. It makes the case for changing the nature of our food economy as the looming food crisis bears down on us (Tim Lang, page 32). It calls for us to re-envision our soil as a living thing that requires care if it is to continue to feed us (Graham Harvey, page 37).

It challenges many received ideas including the notion that a localised food economy will disadvantage farmers in the developing world (Vandana Shiva, page 49). Through its examination of Whole Foods Market it casts an eye on the growing unsustainability of all supermarkets (Chris Milton, page 35). An organic supermarket is after all just a supermarket, dependent on cheap produce flown halfway around the world.

While some scientists argue that rising CO_2 levels will act as airborne fertiliser, studies show that plants grown in such conditions are less nutritious, which has impacts across the food chain (Pat Thomas, page 41). The belief that GM will feed us also crumbles in the face of scientific rigour (Mark Anslow, page 48).

There is still hope, however. A local and organic food economy is possible that could feed the whole of the UK. Far from a retreat into the past, making this switch would catapult us into a modern future where food is more nutritious, more equitably distributed and where jobs contribute to the greater good (Ed Hamer and Mark Anslow, page 43). Finally, it paints an inspiring picture of a vibrant, more engaged and healthier nation fed by this local food economy (Joanna Blythman, page 50)

The bottom line? Either we sit and wait fearfully for disaster, or we embrace the future with intelligence and grace, and a willingness to create a new, truly sustainable food economy with good food for all instead of cheap food for all. The choice is ours.

Photography: ARTHUR WOODCROFT

FOOD INSECURITY

In an increasingly uncertain world, climate change and peak oil are posing a threat to the food of rich and poor nations alike. **Tim Lang** investigates an all-consuming problem

The World Bank's 2008 World Development Report makes a grim prediction of what is to come:

'The future is increasingly uncertain. Models predict that food prices in global markets may reverse their long-term downward trend, creating rising uncertainties about global food security.'

When the architects of globalisation start making such statements, first we should pity those low-income countries dependent on world markets, and second, we can understand why in Whitehall, Brussels and capitals everywhere, food security is also back on the agenda of rich and poor countries alike.

The situation here is fairly sobering. While a 2006 study for Defra by Cranfield University suggested that the UK food system was pretty robust and would prove resilient if there were a crisis or shock of some kind, the hard facts are that the UK is only 63 per cent self-sufficient. This rises to 74 per cent for indigenous (homegrown) foods. Nevertheless, the UK currently imports approximately £22 billion of food and drink each year. Most of this – 68 per cent – comes from elsewhere in the EU.

It's important not to be blinkered about self-reliance: even at the end of World War II the UK produced the same amount of food as it does currently. It's a long time since Britain was truly self-sufficient – the late 18th century in fact – but the situation today is rapidly worsening. In 1995, 27 per cent of UK food was imported. By 2006 it was 37 per cent.

Rising concern

For decades, the term 'food security' was applied only to developing nations. The problem, as the policy makers saw it, was a simple one: 'they' couldn't feed themselves; the solution was therefore to increase 'their' output. What followed was a simple solution – the green revolution – a combination of new plant-breeding and fertilisers. The output from many farms did increase, but farmers were punished for their pains with environmental damage, job losses and a long period of low raw food commodity prices.

Today, the green revolution seems to have run its course. Food prices are rising to such a level that what was once a developing-world problem is now firmly on the radar of the rich. Policy-makers look in vain for another quick fix. They point out that total food production has risen as population has increased, but then acknowledge that food production per capita has fallen to current lows. Thus a new generation of hi-tech agriculturalists are now arguing that only through genetic modification can we hope to feed the world.

There is a dizzying convergence of factors – some economic, some institutional, some social, some environmental – all pointing towards a new period of global food insecurity and renewed worries about the sustainability and fragility of our current food system.

Market speculation is one such factor. In an uncertain world, basic human needs surface as a good investment bet. After decades of chasing easy money – the dot.com boom, property, consumer goods – food now looks like Cinderella, a sector dismissed as a frump not worthy partying

Image: MARY EVANS

Each Kenyan green bean stem is equivalent to four litres of water

for, who turns out to be the belle of the ball. Many commodity traders privately admit that speculation is playing a part in the rises. But only a part. Other factors are purely economic. Rising affluence in India and China has led to a rise in dietary expectations. As consumers get richer, 'feast day' food is eaten more often. Meat consumption is rising, yet animals are inefficient energy converters, require a lot of water and feed, and add to global methane emissions. Combined with attempts by the USA and European Union to alleviate oil dependency by promoting and subsidising biofuels, the price of grain – now used to feed cars as well as humans and livestock – has spiralled.

Increasing population is a further factor. Already at 6.6 billion in 2007, global population is expected to rise to 9.1 billion by 2050. Urbanisation appears unstoppable. In 1961, one billion lived in towns; it was two billion by 1986 and three billion by 2003; it is projected to be four billion by 2018 and five billion by 2030. More people claiming food from limited land means greater scarcity and higher prices. Optimists say new land (or old land in Eastern Europe) will be planted. But displacing what? And with what longer-term repercussions?

Land use also has an influence. In the early 1990s, David and Marcia Pimentel calculated that use of US arable land was at near capacity and that no more was available to cater to a growing population. Land is sometimes mistakenly described as a finite resource. In fact, available land fluctuates, not least with sea levels. The important point for food security is not how much land there is in total, but how much productive land is available. Optimists suggest that the world could bring into use about 12 per cent more land than is currently under cultivation. This might well be so, but marginal lands tend to be less productive and more expensive to use. Moreover, climate change is highly likely to restructure which lands will yield at all. Remember that what we now call the Sahara was probably once the Old Testament Garden of Eden.

Here in the UK, calculations of productive arable land are sorely needed. The Stockholm Environment Institute at York recently calculated that the UK's current food and farming ecological footprint – its land, energy and sea-space use – is up to six times the food-growing area of the UK itself. In northwest England, for example, total household consumption equated to 6.2 global hectares (gha) per resident, of which food consumption, estimated at 1.4 gha/per capita, was the biggest component. In that region, the 20 million tonnes of raw materials produced from the land eventually became just 4.2 million tonnes of food consumed. Half a million tonnes of packaging was used and almost one million tonnes of food and drink were never eaten and sent directly to landfill. The UK throws away 6.7 million tonnes of food annually, a third of food bought. This is equivalent to 15 million tonnes of CO_2. So much for modern efficiency.

Without water, agriculture grinds to a halt. In developed countries with clean tap water widely available, it's easy to forget the long struggles that went on in the 19th and 20th centuries to bring clean water to the urban masses. But in vast areas of the world, sources of water are either unreliable or under threat, and the fight to get decent water in the first place looks as though it might – like food – quietly start to fail, despite the pleas of the World Health Organization and FAO. As environmental science writer Fred Pearce has shown, the world's virtual water trade (the amount of water that is embedded in food or other products needed for its production) is equivalent to 1,000 cubic kilometres, or 20 Nile rivers of water each year, most of it in agricultural crops.

To put it in perspective, consider that, of all the freshwater in the world, 10 per cent is for household use, 20 per cent for industry and 70 per cent for agriculture. In the UK, agriculture accounts for 742 million cubic metres of water consumption compared to the food and drink industry's 155 million cubic metres.

Globally, the UN expects water stress (having less than 1,700 cubic metres of water per person per year) to spread dramatically. Although today 92 per cent of humanity has a relatively sufficient supply of water, by 2025 this is anticipated to drop to just 62 per cent. Embedded water is likely to be as or more important a measure of sustainability as food miles or CO_2 emissions. For instance, 1kg of grain-fed beef takes 15 cubic metres of water and 1kg of grass-fed lamb needs 10 cubic metres, while 1kg of cereals needs only 0.4-3 cubic metres.

Buy imported food and you're buying someone else's water. Each Kenyan green bean stem is equivalent to four litres of water – and this from an officially water-stressed country. Buying this way is a new colonialism.

A seriously under-acknowledged factor in future food security is labour. If urbanisation is inexorable, who will be the rural labour force? Who will grow the food for the urban majority? Will it be urban agriculture? Gardeners? At present, half the world's workforce – 1.1 billion workers – work in agriculture. Of this, 450 million (40 per cent) are waged labour, 170 million are children and 20-30 per cent are women working for lower wages, too often in the export trade. It takes a Swedish farmworker five minutes of work to be able to buy 1kg of cereals at his or her local market. An Indian farmworker takes 37 minutes – but a farmworker in the Central African Republic needs to work for six hours to purchase the same. This is the reality the Fairtrade movement has set out to counter, arguing that urban consumers who barely know where their food comes from need to be re-engaged with the sometimes dire and

hazardous reality of working on the land.

But attracting people back to conventional farming is difficult. Not only is farming poorly paid, but also, in many parts of the world, it is downright dangerous. Half the 355,000 workplace fatalities the International Labour Organisation (ILO) estimates occur each year are in agriculture. Pesticides are a significant contribution to this. The ILO estimates pesticides cause about 70,000 acute and long-term poisoning cases annually, leading to death and a much larger number of acute and long-term non-fatal illnesses.

Failed by our institutions

A further huge factor in the security of our food is the state of the institutions put in place to guard it. The dominant policy position within Government appears to be that the UK is rich and can always afford to buy on world markets. Yet it is increasingly clear that the conditions of 'normality' under which these policies were formed is unlikely to continue. Food trade 'liberalisation' and the pursuit of market solutions that have dominated food politics from the mid-1970s are failing to rise to the sustainability challenge. They are the inheritance of the 1994 General Agreement on Tariffs and Trade (GATT), which created new rules and structures – notably the World Trade Organization and Trade Disputes Mechanism – designed purely to accelerate trade rather than worry about sustainable food systems.

At a global level, the utter lack of joined-up thinking is staggering. The split between the UN advisory bodies – the FAO, WHO, UNEP, ILO and so on – and the financial institutions – the World Bank, WTO and International Monetary Fund – creates endless tensions. Policy-makers concerned about addressing the looming food security crisis tear their hair out in frustration at the failure to see the big picture.

The core fact is that our food institutions are failing to give leadership. This means that NGOs and ordinary citizens must make their voices heard and hold politicians to account. Many in the food sector are nervous, too. Their thoughts and experience should not lightly be dismissed.

The final horsemen

The final hammer-blow to food security is the looming crisis of climate change and peak oil. Climate change itself is a key reason why food security and the resilience of food systems are being discussed so seriously. What if climate change accelerates? Can we predict where and how food can be produced? Do different forms of farming and food production have different impacts on climate? These are vital questions.

Sir Nicholas Stern's report in 2006 states that agriculture is responsible for 14 per cent of greenhouse gas (GHG) emissions. Of these, fertilisers were responsible for 38 per cent. Livestock was the second greatest source of agriculture-related GHGs, accounting for 31 per cent. A 2006 European Joint Research Centre life-cycle analysis concurred, finding that the most significant sectors were meat and meat products, and the dairy sector.

The FAO has more recently calculated that livestock generates 18 per cent of total GHG

emissions (CO_2 equivalent) – more than transport. It is also a major source of land and water degradation, not to mention a source of ammonia, which acidifies ecosystems. By making a meat-based diet the badge of progress we collude with the indefensible.

In addition to climate change, the effects of peak oil may already be upon us. With oil breaking the $100 a barrel mark, the hidden reliance of supposedly efficient modern food systems on black gold is being startlingly revealed to a generation that has forgotten, or never knew, the crises of the 1970s. Some 95 per cent of food products are oil-dependent, and much of the advances in agricultural productivity rely on mechanisation and fertilisers. Peak oil threatens these advances.

In the UK, after three decades in which people have spent ever-smaller proportions of their income on food, the slight price rises of recent months are sending shockwaves. A study for the UK Sustainable Development Commission in 2007, begun when oil was a mere $50 a barrel, estimated that if the price of crude hit $100, food prices would rise between five and 10 per cent. The report was barely released before $100 was breached. As analysts begin to talk of prices reaching $200 a barrel, the million-dollar question is: what would an oil-free food economy look like? Nobody has yet addressed that difficult question (but see *The Future of Food* , page 50).

Where to now?

The demands of the task become clearer by the month. They include how to meet both health and environmental needs; how to produce and distribute enough by agricultural methods that deliver real, not mock 'sustainability'; how to tame rampant food consumerism in which the rich graze the world's food cultures while denuding them of meaning; how to farm and distribute food in a low-impact fashion; how to retain nutritional value while fostering cultural appropriateness. In short, how do we produce food that ticks all the boxes: energy, climate, water, social justice, health, eco-systems, labour and so on?

The good news is that there is growing recognition that food security is one of the key challenges facing humanity. The bad news is that the political debate is still thin and warped by the dominant economic nostra. There are serious differences of policy perspective on offer, of which the new rationale of GM is but one. Each side dismisses the other, when the need is for positions to be pulled out, dissected, refined and debated. There are no quick fixes to food security, never were, never will be. Encouraging calm and widespread debate is the only way we can hope to tackle the myriad factors that are converging to put the dinner plate at the top of the 21st century's list of concerns.

Tim Lang is Professor of Food Policy at City University's Centre for Food Policy, which is conducting a study of food security and sustainability. He is Land Use Commissioner on the UK's Sustainable Development Commission and a member of Chatham House's Food Supply in 21st Century Project. He writes here in a personal capacity

WHAT IS WHOLE FOODS' PROBLEM?

It promised to be the supermarket chain of the sustainable future, but its globalised buying policy and questionable ethics are rapidly consigning Whole Foods Market to a dinosaur past. **Chris Milton** reports

Only a few years ago, stories about Whole Foods Market became famous for their poetic quality, as journalists waxed lyrical about how the fresh, organic fruit in their stores was proof that you could be a successful business while remaining environmentally friendly. Last year, however, sustained questioning by consumers and regulators alike saw the shine come off the company's glossy image.

Most revealing of all, the company's CEO and founder, John Mackay, was investigated for unethical behaviour after being exposed posting investment advice on the internet under a pseudonym, talking his company up and attacking its main competitor, Wild Oats. What made this all the more shocking was that Wild Oats had been the subject of a takeover bid by Whole Foods Market at the time, leaving Mackay open to accusations of market-rigging and fraud.

The company finished the year in a slump. In the US, its share price plummeted amid revelations that it was refusing to support a scheme to raise migrant agricultural workers out of conditions likened to slavery. In the UK, despite the 2004 purchase of the Fresh & Wild chain, the company's new European flagship store in London struggled to draw customers and became embroiled in accusations that it had avoided paying for work permits by claiming US nationals were entering the UK solely to attend meetings.

The revolution, it would appear, is complete. What started out as a small, local, natural foods retailer with a conscience has become just another multi-billion-dollar corporation fudging the issue of ethics in order to satisfy a Wall Street master. How did it all go so wrong?

Where a retail grocer like Whole Foods Market sources its produce is of paramount importance. Large banners festoon many of its stores, extolling the virtues of organic practices and emphasising the importance of supporting local farming, creating the impression for shoppers that it buys food from local, organic and sustainable farms.

In 2005, in fact, more than 40 per cent of the company's main suppliers were not organic and more than half of all produce came from farms not considered to be local to the stores in which it was sold. In addition, most of this produce travels several hundred miles before reaching the store in order to accommodate the company's large processing and distribution centres.

These centres have been part of the company's set-up for nearly 25 years. Their use means most farms have to be able to supply large volumes of produce in order to be economically attractive to Whole Foods Market. Small, local farms are squeezed out as the company sacrifices ecological sustainability for artificially low prices and the convenience of the large producers.

Cementing these distribution centres into its way of doing business, Whole Foods Market has recently instigated its Local Producer Loan Programme. Through this, small farms can take out a loan from the company in order to expand to the point where they are able to produce enough volume to be accepted as a supplier. As the loans are charged at up to nine per cent per annum, they net the company a tidy profit while actively undermining the small, local farms it claims to champion.

Those local producers that do feature in Whole Foods Market stores tend to supply a specialist food, such as shrimps or hummus, or niche products such as gourmet dog biscuits and handcrafted jewellery. In general, the bulk of the day-to-day produce sold in the company's stores comes from non-sustainable sources, just like most supermarkets.

One of the constant defences the company uses for its supply chains is that it has to ship produce over hundreds, if not thousands of miles because the consumer is demanding fresh food. Examples include flying in fresh beef from New Zealand when a local producer could supply frozen meat of the same standard, or using suppliers in developing countries for out-of-season fruit and veg. It has even claimed that shoppers in the US will not buy produce from the nearest available farm if it is located in a different state.

The retail sector, so long the source of confusing advertising, can and should lead the way by clearly informing consumers about the true cost of the products they buy. Standard practice should include informing the customer about alternatives to out-of-season vegetables, publishing comparisons between the CO_2 consumption of frozen and air-freighted meat, and championing locally produced food. Instead, even Whole Foods Market buys into misleading, pastoral imagery to lull the consumer into a false sense of virtue.

The irony is that this story could have been so very different. In the late 1970s, the supply of natural, unprocessed foods was left to small, local co-operative stores, which sprang up to bring farm-fresh foods to those who recognised its value.

Into this arena stepped Whole Foods Market, with an agenda geared towards leaving the co-operative model behind and bringing the supermarket format to natural food stores. Its expansion has become relentless, buying out rivals, refusing to acknowledge workers' rights and seeking to drive food prices to unsustainably low levels.

Had the company stuck to its principles and continued to work within the local frameworks with which it grew up, it could now be leading the grocery business towards greater sustainability. It could be operating a network of local independent stores, co-operating with local farms to bring customers fresh and ecologically sensitive food.

In the end, Whole Foods Market seems determined to ape the big retailers it once derided, pursuing ever-cheaper food at the cost of its original ecological principles and seeming to pander to convenience culture by becoming a market-leader in ready-made organic meals. These days it is in real danger of becoming what its detractors have always called it: 'the Wal Mart of Wheatgerm'.

Chris Milton is a freelance journalist

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FEEDING THE SOIL THAT FEEDS US

Soil is more than simply dirt, says **Graham Harvey** – it is a living thing, an ancient, complex community of organisms that we destroy at our peril

Sometimes when you kick over a clod of earth, it's hard to grasp the complexity of it. We often call it dirt. Unlike 'land', with its real-estate connotations, we attach little value to soil, and yet a good supply of the minerals naturally present in healthy soil is vital for the health of human beings – as it is for all living organisms. Maintaining mineral-rich, fertile soil is essential to our own health.

Minerals are in our food today because of events that took place more than 10,000 years ago. As the glaciers retreated at the end of the last Ice Age, they exposed the fine dust produced by the grinding action of ice on the rocks below. This mineral-rich dust was spread by the wind across the surface of the planet, remineralising soils and producing a burst of biological activity.

Over the past 5,000 years, the glacial minerals have been steadily washed from the soil. This is part of a natural process of demineralisation, brought about chiefly by the action of rainwater on soil. Over the past four decades, however, this process has been cranked up by the rise of chemical farming.

Traditional farming methods aimed to retain minerals in the topsoil. By returning plant and animal wastes to the land, communities were able to slow mineral loss – or even stop it altogether.

One of the earliest forms of fertiliser used by British farmers was marl – a soft, calcium-rich clay soil. Later they began spreading chalk or ground limestone on to the land. In the first half of the 20th century, basic slag – a byproduct of steelmaking – became a popular fertiliser. Besides calcium and phosphorus, it added a large number of trace elements to the soil, including magnesium, iron, zinc and copper.

When modern farmers want to grow a crop they turn first to chemical fertilisers that supply the major plant nutrients – nitrogen, phosphorus and potassium (known as NPK fertilisers after the letters symbolising these elements) – in the form of chemical salts. Crop plants are able to take them up quickly and produce a vigorous burst of growth, but the weakened tissue has to be sprayed with an array of pesticides to stop it succumbing to pests and diseases.

Far from enhancing fertility, the new chemical fertilisers hastened the loss of trace elements from the soil, or so damaged soil structure that they were no longer accessible to plants. As the mineral content of the soil fell, so did their levels in everyday foods.

The chemical approach to feeding plants dates back to the early 19th-century and the work of a clever and charismatic German scientist, Justus von Liebig. He believed that plants obtained their carbon, oxygen, hydrogen and nitrogen from the atmosphere, and the other elements they needed from the soil. These essential elements included iron, sulphur and phosphorus in the form of phosphates.

Liebig was wrong about atmospheric hydrogen, however, and – in the words of Colin Tudge, author of *So Shall We Reap* – 'spectacularly wrong' about nitrogen. Traditional agriculture depends on the recycling of nitrogen through the return to the soil of organic wastes. The other great providers of nitrogen are leguminous plants such as clover and beans, which form symbiotic relationships with soil bacteria of the genus *Rhizobium*, capable of 'fixing' nitrogen from the atmosphere.

Photography: ARTHUR WOODCROFT

By including legumes in their crop rotations, traditional farmers were able to boost the nitrogen fertility of their land. Otherwise the vast quantities of nitrogen present in the atmosphere would largely be unavailable for crop production, except for a small amount converted to ammonia by lightning and carried into the soil with rainwater.

Liebig recanted his early dogmas later in life, but today's farming is nevertheless built on the habit of applying the major plant nutrients and, as such, is leading the world to a precipice because it has ignored the one element that can ensure human health – the life of the soil.

Fertile and productive

The best way to take care of healthy soils is to heap on organic materials – straw and crop residues, manures and composts. A soil that's fertile and productive doesn't need chemical fertilisers or pesticides.

A Cornell University study of the United States' longest-running investigation into organic farming showed that getting rid of pesticide sprays and chemical fertilisers leads to more biological activity in the soil, and ultimately to more food at lower cost.

Led by Professor David Pimentel, the study looked at a 22-year-long trial at the Rodale Institute in Pennsylvania. In it, chemical farming of corn and soybeans was compared with an organic rotation where no chemicals were used.

The research team compared the activity of soil fungi on the two systems as well as a number of other aspects, including crop yields, energy efficiency, costs and the level of organic matter. The organic system produced yields that were as high as those of the chemical system, but they achieved it with 30 per cent less energy, less water and no pesticides.

Crop yields on the organic system were particularly high in drought years. This was because wind and water erosion degraded the soil on the chemical system. On the organic soil, by contrast, the level of organic matter steadily rose, along with moisture levels and the activity of micro-organisms within the soil.

The life subterranean

Soils don't become fertile just because they contain high levels of organic matter and available minerals. To promote healthy growth, they also need large populations of microbes and other soil organisms, an underground army that is constantly breaking down and rebuilding nutrients from plant and animal wastes, and in the process making minerals available to plants. Some five per cent of soil is composed of organic matter – the wastes and decomposed residues of plants and animals, together with the billions of organisms that live in the air-spaces between mineral particles.

It is the actions of this living community that enable plants to grow. They supply plants with the nutrients they need, provide them with water and protect them against toxins and disease. Without the activity of soil organisms – from microscopic bacteria to earthworms – life on the planet would quickly grind to a halt. Chemical farming subjects these living communities to a non-stop toxic barrage, wiping out whole species and disrupting the intricate, below-ground network that keeps plants healthy.

With their natural support systems severely weakened, crop plants become more dependent on pesticides to keep them growing – which is great news for the chemical industry. Many agricultural soils are now so damaged by chemical fertilisers and pesticides that they need ever greater amounts to produce any crop at all. They've been turned into agrochemical junkies, wholly dependent on the local chemical supplier for the next fix.

A single organism

Just a teaspoonful of healthy soil contains more than five billion living organisms, representing 10,000 or so different species. In a fertile pasture producing meat or milk there will be at least twice the weight of 'stock' below ground than there is grazing on the surface vegetation. Most are anonymous, like the crowds in a city street. For the most part, the world a few inches beneath our feet is no better known than the life of deep oceans

What *is* known is that bacteria are likely to be the most numerous group in the teaspoon of fertile soil. There will be two to three billion of them, involved in almost all metabolic processes that go on below ground. In size and activity they'll range from the rhizobia – the family that 'fixes' atmospheric nitrogen in special nodules in plant roots – to the threadlike actinomycetes that appear more like fungi.

Next in complexity come the protozoa – there are likely to be around 50,000 of them in that teaspoon of healthy soil. These single-cell animals feed mostly on bacteria, from which they differ in having at least one well-defined cell nucleus.

Another abundant group are the soil fungi, which may be single-cell yeasts or the more complex multi-cellular moulds. These filamentous fungi are made up of long, branching chains of cells known as hyphae, which may be interwoven to form mycelia, the thin, white strands sometimes visible to the naked eye in leaf litter. Filamentous fungi break down most types of organic material, from tree bark to animal remains. Some species form symbiotic relationships with plant roots, supplying the plant with some of the essential elements it needs in exchange for energy-rich secretions from the root.

Ironically, most farmers rely on fungicide sprays to deal with diseases on their crops. These chemicals are also likely to be killing the very soil fungi that could prevent their crops becoming diseased in the first place

Nematodes also play a key role in the below-ground drama. This group is essentially made up of worms – roundworms, threadworms and eelworms. Originally water-dwellers, some worms migrated to land and became adapted to living in the pores and films of water between soil particles. Farmers see nematodes as the enemy, mainly because they include crop pests such as the potato cyst eelworm, but in well-managed soils, nematodes aid crop production by helping to recycle nutrients and by keeping root-eating species such as the potato eelworm in check

Among the more visible players in the drama are the earthworms. Britain has 25 species, of which 10 are common. An earthworm can live for up to five years, ingesting many times its own weight of soil each day. In doing so it creates a network of pores, which improve drainage and soil aeration. Along the walls it secretes calcium-rich mucus, and from time to time it expels casts containing a range of plant nutrients. Plant roots snake their way through these underground channels, making good use of the nutrient-rich deposits so conveniently left for them.

If earthworms are the stars among the larger soil animals, many others play supporting roles. Among them are soil

Copying Nature

The southern slopes of the Grampian Mountains is not a very promising place to grow crops. Once covered in forest, the land is now exposed to the full might of the Scottish winter. With many of its nutrients washed away, the soil has grown sour and acidic. Coarse upland grasses clothe the hillside that once grew good potato crops.

But a remarkable couple – Cameron and Moira Thompson – have made this desert bloom again, growing a range of superb vegetables. The secret of their success is so simple it's hard to grasp the importance of what they have done.

The soil they're growing in is dark and slightly gritty to the touch. The Thompsons mix it themselves before spreading it on to their garden terraces. It's made from fine rock dust hauled from a nearby quarry and compost made from green waste by Dundee City Council. Together, the two ingredients produce ideal conditions for healthy crop growth. The dust, from volcanic rock basalt, supplies minerals that rainfall and chemical farming have stripped out of many soils. Compost provides the matter for microbial activity, the prerequisite for fertile soil.

By copying nature the Thompsons have effectively reproduced post-glacial conditions on their worn-out 21st-century hillside, and shown that it is possible to grow large, healthy crops without the arsenal of chemicals fertilisers and pesticides used by commercial farmers today.

arthropods, including mites, springtails and beetles. This group breaks up organic wastes and begins the process of nutrient-recycling. A good example is the dung beetle, which stores balls of nutrient-rich animal dung in shallow, underground channels.

In Darwinian terms, these myriad life forms are locked in an unending struggle for survival and genetic immortality. Yet the outcome is seldom – as in human economic systems – the emergence of a few dominant players. A sudden catastrophic change in conditions may lead to a collapse in some species, but the natural response of the soil community is to stabilise the situation and restore diversity.

For all its savage competition, the soil acts almost as a single organism spread across the land surface of the planet. Within it, the ceaseless building up and breaking down of living matter accumulates minerals and locks them in the system so they are not leached away in the groundwater. And it creates humus, the group of long-chain carbon compounds that links with lay particles to form a fine crumb structure. In short, it maintains the perfect conditions for terrestrial life.

The end of the chemical world

In the ancient wisdom of the fields, farmers have always known this. The return of animal and plant wastes as manure and compost was aimed at stimulating the life of the soil. Bacteria and soil fungi need a constant flow of organic material to work on, or their numbers will quickly fall. When this happens, nutrients are lost from the system. In extreme cases the structure breaks down and the soil dies.

Most of the mechanisms through which soil organisms nurture crop plants remain shrouded in mystery, but at Oregon State University, microbiologist Professor Elaine Ingham has started to provide answers. Pared down to its bare essentials, fertility depends on the balance between decomposers – organisms such as bacteria, fungi and certain arthropods that break down soil organic matter – and their predators.

The decomposers are responsible for holding nutrients in the topsoil so they're not washed away in the groundwater. As they get to work

Giving back to our roots

Among the most important soil organisms are a group known collectively as mycorrhiza. These threadlike fungi form intimate links with plant roots, actually penetrating the cells of the root cortex.

It's a mutually beneficial arrangement known in biology as 'symbiosis'. The plant supplies the fungus with carbohydrates and amino acids in its sap; in return, the fungus supplies the plant with minerals, helps it to resist drought and protects it against soil-borne diseases and from harmful nematodes.

In effect, mycorrhiza form an extension of the plant's root system, increasing by as much as much as 60 times the uptake of soil nutrients such as phosphorus, zinc, copper and magnesium.

Gloucestershire farmer John Reeves has carried out dozens of experiments to find out how the presence or absence of mycorrhiza in the soil affects the mineral content of the crops he grows.

His trials on a range of everyday vegetables such as carrots, peas, onions, parsnips, potatoes and broad beans have shown that when the vegetables are grown on cultivated soils without chemical fertilisers, their mineral scores are satisfactory, though not high. When they are grown on soils that had been treated with chemical fertilisers – phosphates – however, they contained up to a quarter fewer minerals.

Inoculating soils with mycorrhiza proved to have exactly the opposite effect – the mineral content of the soil was up to two-thirds greater than that of soils fertilised by chemicals.

on organic matter in the soil, the nutrients released by the decomposers are incorporated into their body tissue. Bacteria and fungi together account for a large proportion of the nitrogen, phosphorus, sulphur and other minerals safely secured in the topsoil.

For these minerals to become available to plants once more they must first be freed back into the soil through the process of mineralisation. This is where the predators come in. They include groups such as protozoa, nematodes, small arthropods and earthworms, which feed on the bacteria and fungi. In doing so they release much of the nitrogen and other minerals, making these available to plants.

Together, protozoa and nematodes regulate the process of mineralisation – but their numbers are controlled in turn by a higher order of predators such as millipedes, centipedes, beetles, spiders and small mammals. It's this constant melée of lifeforms – from the simplest to the most advanced – that is the foundation of fertility, the provider of plenty and the guarantor of health. Ingham calls it the soil food-web. The greater its complexity – the more momentous the underground struggle between predator and prey – the more the earth will produce.

But the farming methods of industrial countries seem designed to wreck this ordered complexity. Chemical fertilisers, pesticides, soil fungicides and fumigants (which sterilise the soil) – the arsenal used by industrial farmers in their battle with nature – all kill bacteria and fungi. Overwhelmingly, it's the beneficial species that are hit hardest. That's when disease organisms seize the opportunity to strike at crops.

It's a similar story to the overuse of antibiotics. When they were first introduced, antibiotics seemed to offer a miracle cure for some of the world's worst disease scourges. As they were used more widely, drug-resistant organisms began to appear. At the same time, beneficial bugs were knocked out by the indiscriminate new products, leaving the field clear for more malign organisms.

In the same way, when chemical fertilisers or pesticides take out bacteria and fungi in the soil, a host of dependent organisms vanish along with them. Predators are knocked out with prey species. Soon the soil ecosystem starts to break down. The normal checks and balances no longer work, and disease-causing species move into the vacant space.

Chemical farming is portrayed as a great triumph of western technology because it produces mountains of grain and tanker-loads of milk. But who can take pride in a system that destroys the Earth's most precious asset – its soil?

Graham Harvey is a journalist and the author of *The Killing of the Countryside* and *We Want Real Food* (see below)

Text adapted from:
We Want Real Food: The Local Food Lover's Bible
Graham Harvey
£9.99 (Robinson, 2006)

SOWING FALSE HOPES

Don't believe everything you hear or read, warns **Pat Thomas**. There really isn't an agricultural bright side to rising levels of CO_2

With an amazing determination to see a silver lining to the dark cloud of climate change, some scientists are now predicting that an atmosphere rich in CO_2 may actually benefit agricultural production by acting as a kind of airborne fertiliser.

The basic theory – 'CO_2 fertilisation' – is sound. All life on Earth is carbon-based. CO_2 can act as a fertiliser because plants synthesise the glucose they need to grow from sunlight, water and CO_2 (photosynthesis). Because atmospheric CO_2 acts like a 'fertiliser', many commercial greenhouses artificially raise CO_2 levels to accelerate plant growth.

There is a catch, however. While higher levels of CO_2 can significantly stimulate crop yields in enclosed spaces like greenhouses, the effect in the real world is significantly less impressive.

The results of studies in controlled environments during the 1970s and 80s suggested that CO_2 fertilisation could offset crop losses due to climate changes. But newer data is more equivocal. For instance, studies of soybean plants grown in enclosed environments show a 28-30 per cent increase in yield when the atmosphere contains 550 parts per million CO_2. But in open-field experiments (known as FACE, or Free Air CO_2 Enrichment) with the same atmospheric CO_2 concentrations, this drops to an increase of between 13 and 15 per cent. In fact, overall FACE studies suggest that yields from open fields are only half those of closed chambers.

In addition, increases in yield are not universal. Indeed, Pramod Aggarwal, head of environmental sciences at the Indian Agricultural Research Institute in New Delhi and a co-author of the food, fibre and forest-products section of the IPCC's latest report, says the idea that CO_2 fertilisation will offset weather-related losses 'is a Western point of view' that ignores much of the developing and underdeveloped world.

According to Aggarwal, high CO_2 levels are beneficial only when crops are adequately fertilised, irrigated and protected from pests, so food crops in tropical climates will derive less – if any – yield benefit.

William R. Cline, a senior fellow jointly at the Peterson Institute for International Economics and the Center for Global Development in Washington, DC, agrees. His research, summarised in his recent book *Global Warming and Agriculture*, suggests that as atmospheric CO_2 levels rise the world's overall agricultural productivity will decline by between three and 16 per cent by 2080 – even with the effect of CO_2 fertilisation.

If climate change continues on its current trajectory, Cline argues, the US, Canada, most of Europe and Russia could see agricultural gains, but India, Pakistan, most of Africa and most of Latin America would be hit very hard. In the developing world, he estimates India's decline in agricultural production could be between 29 and 38 per cent, while crop yields in Sudan and Senegal could decline by more than 50 per cent. Not all rich countries escape either: in a high-CO_2 world Australia could see yields declining between 16 and 27 per cent.

But overly optimistic predictions about crop growth with CO_2 fertilisation also ignore disturbing data on plant biology.

As described in *Nature* article 'The Other Greenhouse Effect', published in August 2007, research is beginning to show that levels of plant nutrients go down as CO_2 goes up. Researchers have observed significantly lowered levels of protein, especially wheat gluten (an effect that reduces baking quality), lowered trace mineral content, lowered vitamin C in potatoes and lowered calcium in soybeans (potentially problematic for those who substitute soya milk for cows' milk).

Why the nutritional quality of plants should decline in a CO_2-rich environment is still poorly understood. One theory is that while a CO_2-enriched atmosphere triggers the plant to produce higher levels of carbohydrates it does not boost the plants' ability to take relatively more nutrients form the roots.

Plants exposed to higher levels of CO_2 also appear to develop narrower stomata, through which they exhale water vapour in a process known as transpiration. Some studies suggest that transpiration decreases by around 23 per cent in high-CO_2 environments. This makes plants more drought-resistant, but it also means that fewer waterborne nutrients are taken up by the roots.

In addition to reducing the micronutrient content of plants, rising CO_2 levels have been found to drive up the production of plant non-nutrients such as tannins and phenolics – 'poisons' that enhance plant defences against their would-be consumers. Their potential effect on plant-eaters is not well understood.

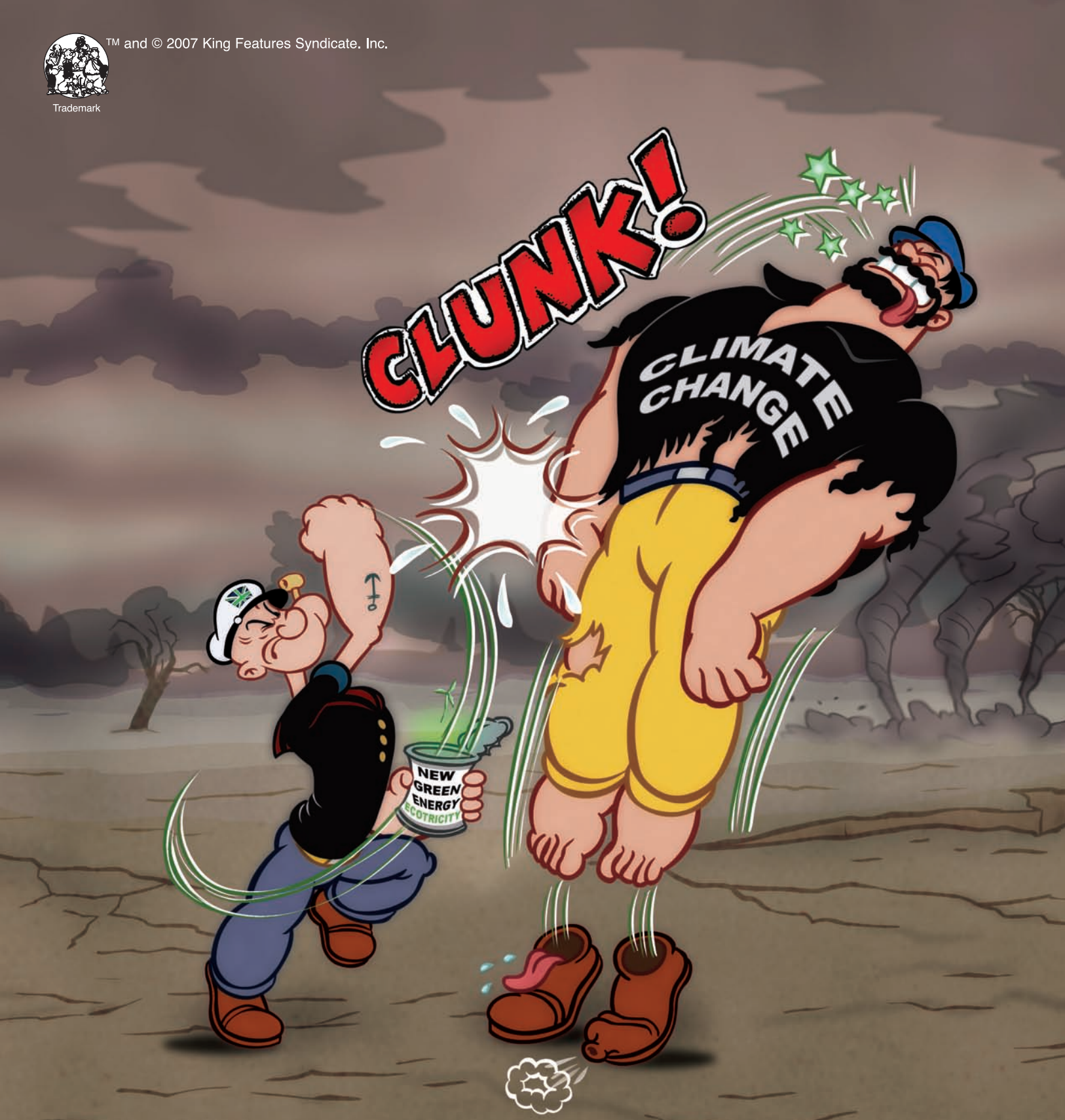
Humans aren't the only animals to eat plants and the effect of lower nutritional quality of plants is not only a vegetarian issue. Grazing livestock eat plants and we eat the livestock. So as nutrient levels decline the full range of what we eat is affected. Research at Kansas State University recently found that the grass grown in high-CO_2 conditions was less digestible, with lower nitrogen and protein content, and concluded that these changes were dramatic enough to reduce the growth rate of cattle grazing on prairie, even if the animals continued to eat the same amount of grass. Wild animals' nutritional status and growth will also be affected.

Plants grown in a high-CO_2 atmosphere may also be more vulnerable to the pests that exist at the other end of the food chain. One of the studies cited in the *Nature* article found that certain types of plant pests thrive on the CO_2-fertilised soybean leaves, laying eggs that destroy the following year's crop.

Conventional agricultural science suggests we can overcome problems of atmospheric CO_2 in plants simply by using more fertilisers or pesticides, or by giving livestock more synthetic nutrients in their diets. This, of course, assumes the oil on which fertilisers and pesticides is based will continue to flow. It also ignores the terrible damage that the continued usage of fertilisers and pesticides does to the soil – the true source of good food right along the food chain.

Far from being a boon to agriculture, rising CO_2 levels are likely to exacerbate the problems of hidden malnutrition in the developed world, while placing poor countries on the road to the devastating famines they have previously known. This is one silver lining we should do our utmost to avoid.

Pat Thomas is Editor of the *Ecologist*



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10 REASONS WHY ORGANIC CAN FEED THE WORLD

Can organic farming feed the world? **Ed Hamer** and **Mark Anslow** say yes, but we must farm and eat differently

1 Yield

Switching to organic farming would have different effects according to where in the world you live and how you currently farm.

Studies show that the less-industrialised world stands to benefit the most. In southern Brazil, maize and wheat yields doubled on farms that changed to green manures and nitrogen-fixing leguminous vegetables instead of chemical fertilisers. In Mexico, coffee-growers who chose to move to fully organic production methods saw increases of 50 per cent in the weight of beans they harvested. In fact, in an analysis of more than 286 organic conversions in 57 countries, the average yield increase was found to be an impressive 64 per cent.

The situation is more complex in the industrialised world, where farms are large, intensive facilities, and opinions are divided on how organic yields would compare.

Research by the University of Essex in 1999 found that, although yields on US farms that converted to organic initially dropped by between 10 and 15 per cent, they soon recovered, and the farms became more productive than their all-chemical counterparts. In the UK, however, a study by the Elm Farm Research Centre predicted that a national transition to all-organic farming would see cereal, rapeseed and sugar beet yields fall by between 30 and 60 per cent. Even the Soil Association admits that, on average in the UK, organic yields are 30 per cent lower than non-organic.

So can we hope to feed ourselves organically in the British Isles and Northern Europe? An analysis by former *Ecologist* editor Simon Fairlie in *The Land* journal suggests that we can, but only if we are prepared to rethink our diet and farming practices. In Fairlie's scenario, each of the UK's 60 million citizens could have organic cereals, potatoes, sugar, vegetables and fruit, fish, pork, chicken and beef, as well as wool and flax for clothes and biomass crops for heating. To achieve this we'd each have to cut down to around 230g of beef (½lb), compared to an average of 630g (1½lb) today, 252g of pork/bacon, 210g of chicken and just under 4kg (9lb) of dairy produce each week – considerably more than the country enjoyed in 1945. We would probably need to supplement our diet with homegrown vegetables, save our food scraps as livestock feed and reform the sewage system to use our waste as an organic fertiliser.

2 Energy

Currently, we use around 10 calories of fossil energy to produce one calorie of food energy. In a fuel-scarce future, which experts think could arrive as early as 2012, such numbers simply won't stack up.

Studies by the Department for Environment, Food and Rural affairs over the past three years have shown that, on average, organically grown crops use 25 per cent less energy than their chemical cousins. Certain crops achieve even better reductions,

Photography: ARTHUR WOODCROFT

including organic leeks (58 per cent less energy) and broccoli (49 per cent less energy).

When these savings are combined with stringent energy conservation and local distribution and consumption (such as organic box schemes), energy-use dwindles to a fraction of that needed for an intensive, centralised food system. A study by the University of Surrey shows that food from Tolhurst Organic Produce, a smallholding in Berkshire, which supplies 400 households with vegetable boxes, uses 90 per cent less energy than if non-organic produce had been delivered and bought in a supermarket.

'Organic farms even have the potential to become energy exporters'

Far from being simply 'energy-lite', however, organic farms have the potential to become self-sufficient in energy – or even to become energy exporters. The 'Dream Farm' model, first proposed by Mauritius-born agro-scientist George Chan, sees farms feeding manure and waste from livestock and crops into biodigesters, which convert it into a methane-rich gas to be used for creating heat and electricity. The residue from these biodigesters is a crumbly, nutrient-rich fertiliser, which can be spread on soil to increase crop yields or further digested by algae and used as a fish or animal feed.

3 Greenhouse gas emissions and climate change

Despite organic farming's low-energy methods, it is not in reducing demand for power that the techniques stand to make the biggest savings in greenhouse gas emissions.

The production of ammonium nitrate fertiliser, which is indispensable to conventional farming, produces vast quantities of nitrous oxide – a greenhouse gas with a global warming potential some 320 times greater than that of CO_2. In fact, the production of one tonne of ammonium nitrate creates 6.7 tonnes of greenhouse gases (CO_2e), and was responsible for around 10 per cent of all industrial greenhouse gas emissions in Europe in 2003.

The techniques used in organic agriculture to enhance soil fertility in turn encourage crops to develop deeper roots, which increase the amount of organic matter in the soil, locking up carbon underground and keeping it out of the atmosphere. The opposite happens in conventional farming: high quantities of artificially supplied nutrients encourage quick growth and shallow roots. A study published in 1995 in the journal *Ecological Applications* found that levels of carbon in the soils of organic farms in California were as much as 28 per cent higher as a result. And research by the Rodale Institute shows that if the US were to convert all its corn and soybean fields to organic methods, the amount of carbon that could be stored in the soil would equal 73 per cent of the country's Kyoto targets for CO_2 reduction.

Organic farming might also go some way towards salvaging the reputation of the cow, demonised in 2007 as a major source of methane at both ends of its digestive tract. There's no doubt that this is a problem: estimates put global methane emissions from ruminant livestock at around 80 million tonnes a year, equivalent to around two billion tonnes of CO_2, or close to the annual CO_2 output of Russia and the UK combined. But by changing the pasturage on which animals graze to legumes such as clover or birdsfoot trefoil (often grown anyway by organic farmers to improve soil nitrogen content), scientists at the Institute of Grassland and Environmental Research believe that methane emissions could be cut dramatically. Because the leguminous foliage is more digestible, bacteria in the cow's gut are less able to turn the fodder into methane. Cows also seem naturally to prefer eating birdsfoot trefoil to ordinary grass.

4 Water use

Agriculture is officially the most thirsty industry on the planet, consuming a staggering 72 per cent of all global freshwater at a time when the UN says 80 per cent of our water supplies are being overexploited.

This hasn't always been the case. Traditionally, agricultural crops were restricted to those areas best suited to their physiology, with drought-tolerant species grown in the tropics and water-demanding crops in temperate regions. Global trade throughout the second half of the last century led to a worldwide production of grains dominated by a handful of high-yielding cereal crops, notably wheat, maize and rice. These thirsty cereals – the 'big three' – now account for more than half of the world's plant-based calories and 85 per cent of total grain production.

Organic agriculture is different. Due to its emphasis on healthy soil structure, organic farming avoids many of the problems associated with compaction, erosion, salinisation and soil degradation, which are prevalent in intensive systems. Organic manures and green mulches are applied even before the crop is sown, leading to a process known as 'mineralisation' – literally the fixing of minerals in the soil. Mineralised organic matter, conspicuously absent from synthetic fertilisers, is one of the essential ingredients required physically and chemically to hold water on the land.

Organic management also uses crop rotations, undersowing and mixed cropping to provide the soil with near-continuous cover. By contrast, conventional farm soils may be left uncovered for extended periods prior to sowing, and again following the harvest, leaving essential organic matter fully exposed to erosion by rain, wind and sunlight.

In the US, a 25-year Rodale Institute experiment on climatic extremes found that, due to improved soil structure, organic systems consistently achieve higher yields during periods both of drought and flooding.

5 Localisation

The globalisation of our food supply, which gives us Peruvian apples in June and Spanish lettuces in February, has seen our food reduced to a commodity in an increasingly volatile global marketplace. Although year-round availability makes for good marketing in the eyes of the biggest retailers, the costs to the environment are immense.

Friends of the Earth estimates that the average meal in the UK travels 1,000 miles from plot to plate. In 2005, Defra released a comprehensive report on food miles in the UK, which valued the direct environmental,

social and economic costs of food transport in Britain at £9 billion each year. In addition, food transport accounted for more than 30 billion vehicle kilometres, 25 per cent of all HGV journeys and 19 million tonnes of carbon dioxide emissions in 2002 alone.

The organic movement was born out of a commitment to provide local food for local people, and so it is logical that organic marketing encourages localisation through veg boxes, farm shops and stalls. Between 2005 and 2006, organic sales made through direct marketing outlets such as these increased by 53 per cent, from £95 to £146 million, more than double the sales growth experienced by the major supermarkets. As we enter an age of unprecedented food insecurity, it is essential that our consumption reflects not only what is desirable, but also what is ultimately sustainable. While the 'organic' label itself may inevitably be hijacked, 'organic and local' represents a solution with which the global players can simply never compete.

6 Pesticides

It is a shocking testimony to the power of the agrochemical industry that in the 45 years since Rachel Carson published her pesticide warning *Silent Spring*, the number of commercially available synthetic pesticides has risen from 22 to more than 450.

According to the World Health Organization there are an estimated 20,000 accidental deaths worldwide each year from pesticide exposure and poisoning. More than 31 million kilograms of pesticide were applied to UK crops alone in 2005, 0.5 kilograms for every person in the country. A spiralling dependence on pesticides throughout recent decades has resulted in a catalogue of repercussions, including pest resistance, disease susceptibility, loss of natural biological controls and reduced nutrient-cycling.

Organic farmers, on the other hand, believe that a healthy plant grown in a healthy soil will ultimately be more resistant to pest damage. Organic systems encourage a variety of natural methods to enhance soil and plant health, in turn reducing incidences of pests, weeds and disease.

First and foremost, because organic plants grow comparatively slower than conventional varieties they have thicker cell walls, which provide a tougher natural barrier to pests. Rotations or 'break-crops', which are central to organic production, also provide a physical obstacle to pest and disease lifecycles by removing crops from a given plot for extended periods. Organic systems also rely heavily on a rich agro-ecosystem in which many agricultural pests can be controlled by their natural predators.

Inevitably, however, there are times when pestilence attacks are especially prolonged or virulent, and here permitted pesticides may be used. The use of organic pesticides is heavily regulated and the International Federation of Organic Agriculture Movements (IFOAM) requires specific criteria to be met before pesticide applications can be justified.

There are in fact only four active ingredients permitted for use on organic crops: copper fungicides, restricted largely to potatoes and occasionally orchards; sulphur, used to control additional elements of fungal diseases; Retenone, a naturally occurring plant extract, and soft soap, derived from potassium soap and used to control aphids. Herbicides are entirely prohibited.

7 Ecosystem impact

Farmland accounts for 70 per cent of UK land mass, making it the single most influential enterprise affecting our wildlife. Incentives offered for intensification under the Common Agricultural Policy are largely responsible for negative ecosystem impacts over recent years. Since 1962, farmland bird numbers have declined by an average of 30 per cent. During the same period more than 192,000 kilometres of hedgerows have been removed, while 45 per cent of our ancient woodland has been converted to cropland.

By contrast, organic farms actively encourage biodiversity in order to maintain soil fertility and aid natural pest control. Mixed farming systems ensure that a diversity of food and nesting sites are available throughout the year, compared with conventional farms where autumn sow crops leave little winter vegetation available.

Organic production systems are designed to respect the balance observed in our natural ecosystems. It is widely accepted that controlling or suppressing one element of wildlife, even if it is a pest, will have unpredictable impacts on the rest of the food chain. Instead, organic producers regard a healthy ecosystem as essential to a healthy farm, rather than a barrier to production.

In 2005, a report by English Nature and the RSPB on the impacts of organic farming on biodiversity reviewed more than 70 independent studies of flora, invertebrates, birds and mammals within organic and conventional farming systems. It concluded that biodiversity is enhanced at every level of the food chain under organic management practices, from soil micro-biota right through to farmland birds and the largest mammals.

8 Nutritional benefits

While an all-organic farming system might mean we'd have to make do with slightly less food than we're used to, research shows that we can rest assured it would be better for us.

In 2001, a study in the *Journal of Complementary Medicine* found that organic crops contained higher levels of 21 essential nutrients than their conventionally grown counterparts, including iron, magnesium, phosphorus and vitamin C. The organic crops also contained lower levels of nitrates, which can be toxic to the body.

Other studies have found significantly higher levels of vitamins – as well as polyphenols and antioxidants – in organic fruit and veg, all of which are thought to play a role in cancer-prevention within the body.

Scientists have also been able to work out why organic farming produces more nutritious food. Avoiding chemical fertiliser reduces nitrates levels in the food; better-quality soil increases the availability of trace minerals, and reduced levels of pesticides mean that the plants' own immune systems grow stronger, producing higher levels of

antioxidants. Slower rates of growth also mean that organic food frequently contains higher levels of dry mass, meaning that fruit and vegetables are less pumped up with water and so contain more nutrients by weight than intensively grown crops do.

Milk from organically fed cows has been found to contain higher levels of nutrients in six separate studies, including omega-3 fatty acids, vitamin E, and beta-carotene, all of which can help prevent cancer. One experiment discovered that levels of omega-3 in organic milk were on average 68 per cent higher than in non-organic alternatives.

But as well as giving us more of what we do need, organic food can help to give us less of what we don't. In 2000, the UN Food and Agriculture Organization (FAO) found that organically produced food had 'lower levels of pesticide and veterinary drug residues' than non-organic did. Although organic farmers are allowed to use antibiotics when absolutely necessary to treat disease, the routine use of the drugs in animal feed – common on intensive livestock farms – is forbidden. This means a shift to organic livestock farming could help tackle problems such as the emergence of antibiotic-resistant bacteria.

'93,000 new jobs would be created if all farming in the UK converted to organic'

9 Seed-saving

Seeds are not simply a source of food; they are living testimony to more than 10,000 years of agricultural domestication. Tragically, however, they are a resource that has suffered unprecedented neglect. The UN FAO estimates that 75 per cent of the genetic diversity of agricultural crops has been lost over the past 100 years.

Traditionally, farming communities have saved seeds year-on-year, both in order to save costs and to trade with their neighbours. As a result, seed varieties evolved in response to local climatic and seasonal conditions, leading to a wide variety of fruiting times, seed size, appearance and flavour. More importantly, this meant a constant updating process for the seed's genetic resistance to changing climatic conditions, new pests and diseases.

By contrast, modern intensive agriculture depends on relatively few crops – only about 150 species are cultivated on any significant scale worldwide. This is the inheritance of the Green Revolution, which in the late 1950s perfected varieties Filial 1, or F1 seed technology, which produced hybrid seeds with specifically desirable genetic qualities. These new high-yield seeds were widely adopted, but because the genetic makeup of hybrid F1 seeds becomes diluted following the first harvest, the manufacturers ensured that farmers return for more seed year on year.

With its emphasis on diversity, organic farming is somewhat cushioned from exploitation on this scale, but even Syngenta, the world's third-largest biotech company, now offers organic seed lines. Although seed-saving is not a prerequisite for organic production, the holistic nature of organics lends itself well to conserving seed.

In support of this, the Heritage Seed Library, in Warwickshire, is a collection of more than 800 open-pollinated organic varieties, which have been carefully preserved by gardeners across the country. Although their seeds are not yet commercially available, the Library is at the forefront of addressing the alarming erosion of our agricultural diversity.

Seed-saving and the development of local varieties must become a key component of organic farming, giving crops the potential to evolve in response to what could be rapidly changing climatic conditions. This will help agriculture keeps pace with climate change in the field, rather than in the laboratory.

10 Job creation

There is no doubt British farming is currently in crisis. With an average of 37 farmers leaving the land every day, there are now more prisoners behind bars in the UK than there are farmers in the fields.

Although it has been slow, the decline in the rural labour force is a predictable consequence of the industrialisation of agriculture. A mere one per cent of the UK workforce is now employed in land-related enterprises, compared with 35 per cent at the turn of the last century.

The implications of this decline are serious. A skilled agricultural workforce will be essential in order to maintain food security in the coming transition towards a new model of post-fossil fuel farming. Many of these skills have already been eroded through mechanisation and a move towards more specialised and intensive production systems.

Organic farming is an exception to these trends. By its nature, organic production relies on labour-intensive management practices. Smaller, more diverse farming systems require a level of husbandry that is simply uneconomical at any other scale. Organic crops and livestock also demand specialist knowledge and regular monitoring in the absence of agrochemical controls.

According to a 2006 report by the University of Essex, organic farming in the UK provides 32 per cent more jobs per farm than comparable non-organic farms. Interestingly, the report also concluded that the higher employment observed could not be replicated in non-organic farming through initiatives such as local marketing. Instead, the majority (81 per cent) of total employment on organic farms was created by the organic production system itself. The report estimates that 93,000 new jobs would be created if all farming in the UK were to convert to organic.

Organic farming also accounts for more younger employees than any other sector in the industry. The average age of conventional UK farmers is now 56, yet organic farms increasingly attract a younger more enthusiastic workforce, people who view organics as the future of food production. It is for this next generation of farmers that Organic Futures, a campaign group set up by the Soil Association in 2007, is striving to provide a platform.

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AND 10 REASONS WHY GM WON'T

1 Failure to deliver

Despite the hype, genetic modification consistently fails to live up to industry claims. Only two GM traits have ever made it to market: herbicide resistance and BT toxin expression (see below). Other promises of genetic modification have failed to materialise. The much vaunted GM 'golden rice' – hailed as a cure to vitamin A deficiency – has never made it out of the laboratory, partly because in order to meet recommended levels of vitamin A intake, consumers would need to eat 12 bowls of the rice every day. In 2004, the Kenyan government admitted that Monsanto's GM sweet potatoes were no more resistant to feathery mottle virus than ordinary strains, and in fact produced lower yields. And in January 2008, news that scientists had modified a carrot to cure osteoporosis by providing calcium had to be weighed against the fact that you would need to eat 1.6 kilograms of these vegetables each day to meet your recommended calcium intake.

2 Costing the Earth

GM crops are costing farmers and governments more money than they are making. In 2003, a report by the Soil Association estimated the cost to the US economy of GM crops at around $12 billion (£6 billion) since 1999, on account of inflated farm subsidies, loss of export orders and various seed recalls. A study in Iowa found that GM soyabeans required all the same costs as conventional farming but, because they produced lower yields (see below), the farmers ended up making no profit at all. In India, an independent study found that BT cotton crops were costing farmers 10 per cent more than non-BT variants and bringing in 40 per cent lower profits. Between 2001 and 2005, more than 32,000 Indian farmers committed suicide, most as a result of mounting debts caused by inadequate crops.

3 Contamination and gene escape

No matter how hard you try, you can never be sure that what you are eating is GM-free. In a recent article, the *New Scientist* admitted that contamination and cross-fertilisation between GM and non-GM crops 'has happened on many occasions already'. In late 2007, US company Scotts Miracle-Gro was fined $500,000 by the US Department of Agriculture when genetic material from a new golf-course grass Scotts had been testing was found in native grasses as far as 13 miles away from the test sites, apparently released when freshly cut grass was caught and blown by the wind. In 2006, an analysis of 40 Spanish conventional and organic farms found that eight were contaminated with GM corn varieties, including one farmer whose crop contained 12.6 per cent GM plants.

4 Reliance on pesticides

Far from reducing dependency on pesticides and fertilisers, GM crops frequently increase farmers' reliance on these products. Herbicide-resistant crops can be sprayed indiscriminately with

Photography: ARTHUR WOODCROFT

weedkillers such as Monsanto's 'Roundup' because they are engineered to withstand the effect of the chemical. This means that significantly higher levels of herbicide are found in the final food product, however, and often a second herbicide is used in the late stages of the crop to promote 'dessication' or drying, meaning these crops receive a double dose of harmful chemicals. BT maize, engineered to produce an insecticidal toxin, has never eliminated the use of pesticides, and because the BT gene cannot be 'switched off' the crops continue to produce the toxin right up until harvest, reaching the consumer at its highest possible concentrations.

5 'Frankenfoods'

Despite the best efforts of the biotech industry, consumers remain staunchly opposed to GM food. In 2007, the vast majority of 11,700 responses to the Government's consultation on whether contamination of organic food with traces of GM crops should be allowed were strongly negative. The Government's own 'GM Nation' debate in 2003 discovered that half of its participants 'never want to see GM crops grown in the United Kingdom under any circumstances', and 96 per cent thought that society knew too little about the health impacts of genetic modification. In India, farmers' experience of BT cotton has been so disastrous that the Maharashtra government now advises that farmers grow soybeans instead. And in Australia, over 250 food companies lodged appeals with the state governments of New South Wales and Victoria over the lifting of bans against growing GM canola crops.

6 Breeding resistance

Nature is smart, and there are already reports of species resistant to GM crops emerging. This is seen in the emergence of new 'superweeds' on farms in North America – plants that have evolved the ability to withstand the industry's chemicals. A report by then UK conservation body English Nature (now Natural England), in 2002, revealed that oilseed rape plants that had developed resistance to three or more herbicides were 'not uncommon' in Canada. The superweeds had been created through random crosses between neighbouring GM crops. In order to tackle these superweeds, Canadian farmers were forced to resort to even stronger, more toxic herbicides. Similarly, pests (notably the diamondback moth) have been quick to develop resistance to BT toxin, and in 2007 swarms of mealy bugs began attacking supposedly pest-resistant Indian cotton.

7 Creating problems for solutions

Many of the so-called 'problems' for which the biotechnology industry develops 'solutions' seem to be notions of PR rather than science. Herbicide-resistance was sold under the claim that because crops could be doused in chemicals, there would be much less need to weed mechanically or plough the soil, keeping more carbon and nitrates under the surface. But a new long-term study by the US Agricultural Research Service has shown that organic farming, even with ploughing, stores more carbon than the GM crops save. BT cotton was claimed to increase resistance to pests, but farmers in East Africa discovered that by planting a local weed amid their corn crop, they could lure pests to lay their eggs on the weed and not the crop.

8 Health risks

The results of tests on animals exposed to GM crops give serious cause for concern over their safety. In 1998, Scottish scientists found damage to every single internal organ in rats fed blight-resistant GM potatoes. In a 2006 experiment, female rats fed on herbicide-resistant soybeans gave birth to severely stunted pups, of which half died within three weeks. The survivors were sterile. In the same year, Indian news agencies reported that thousands of sheep allowed to graze on BT cotton crop residues had died suddenly. Further cases of livestock deaths followed in 2007. There have also been reports of allergy-like symptoms among Indian labourers in BT cotton fields. In 2002, the only trial ever to involve human beings appeared to show that altered genetic material from GM soybeans not only survives in the human gut, but may even pass its genetic material to bacteria within the digestive system.

9 Left hungry

GM crops have always come with promises of increased yields for farmers, but this has rarely been the case. A three-year study of 87 villages in India found that non-BT cotton consistently produced 30 per cent higher yields than the (more expensive) GM alternative. It is now widely accepted that GM soybeans produce consistently lower yields than conventional varieties. In 1992, Monsanto's own trials showed that the company's Roundup Ready soybeans yield 11.5 per cent less on harvest. Later Monsanto studies went on to reveal that some trials of GM canola crops in Australia actually produced yields 16 per cent below the non-GM national average.

10 Wedded to fertilisers and fossil fuels

No genetically modified crop has yet eliminated the need for chemical fertilisers in order to achieve expected yields. Although the industry has made much of the possibility of splicing nitrogen-fixing genes into commercial food crops in order to boost yields, there has so far been little success. This means that GM crops are just as dependent on fossil fuels to make fertilisers as conventional agriculture. In addition to this, GM traits are often specifically designed to fit with large-scale industrial agriculture. Herbicide resistance is of no real benefit unless your farm is too vast to weed mechanically, and it presumes that the farmers already farm in a way that involves the chemical spraying of their crops. Similarly, BT toxin expression is designed to counteract the problem of pest control in vast monocultures, which encourage infestations. In a world that will soon have to change its view of farming – facing as it does the twin challenges of climate change and peak oil – GM crops will soon come to look like a relic of bygone practices.

Mark Anslow is the *Ecologist*'s senior reporter

HOW TO GROW POVERTY

The seeds of a less polluted and more sustainable future depend upon the welfare of our farmers and their fields. **Dr Vandana Shiva** leads a new agricultural revolution

International trade in agricultural produce is not new. Spices and cotton from India have been exported to other countries for centuries, since these crops need special climates and soils to grow.

What is new about today's globalised trade, however, is that it is destroying food sovereignty and biodiversity, forcing the developing world to become dependent upon imports of basic foods such as cereals and edible oils at ever-increasing cost, and on exports of luxury crops such as flowers, temperate vegetables and fruits at ever declining prices.

Those in the North who feel that it helps the poor in the South to import lettuce and green beans from Africa and broccoli and barleycorn from India ignore a number of basic issues.

In this sort of food system, the poor are in fact being displaced to make way for the corporate farms that export vegetables. In India's Punjab, for example, huge land conflicts have been triggered by the appropriation of land belonging to small farmers for corporate farms that are growing vegetables for Tesco and other supermarket chains.

Transfer of land from peasants to corporations is just the first negative impact of an export-oriented agriculture. With it, farmers become workers on corporate farms, instead of being sovereign producers on their own land. Farmers are being destroyed because the price of farm products is driven down by a combination of monopolistic buying by global corporations and the dumping of subsidised products.

An export agriculture controlled by corporations also displaces local biodiversity and local foods, creating malnutrition and hunger. Food is reduced to a commodity and biodiversity destroyed for monocultures of corn, soya and canola. These commodities can be used to run cars, feed animals in factory farms or to feed people. The uniqueness, distinctiveness, quality, nutrition and taste of food are no longer part of the equation.

In our organic farm at Navdanya, we are actively involved in the rejuvenation of indigenous knowledge and culture, and have helped create awareness of these issues. Our work on the farm is guided by four core principles of organic and local.

The first is to provide food for the soil and its millions of micro-organisms. Organic can be organic only if the food rights of these organisms are protected. This involves growing food for the soil, not simply commodities for the market. In fact, all 'developments' in industrial agriculture result in increasing commodity production, all at the cost of producing organic matter to be returned to the soil.

The Green Revolution, with its chemical-intensive dwarf varieties, kills these soil organisms and breeds varieties with less straw. As a result no organic matter is returned to the soil. Genetic engineering of herbicide-resistant crops such as Roundup Ready soya and corn also kills vegetation which would have gone back to feed the soil. Feeding markets while starving the soil is a recipe for hunger and desertification. If we feed the soil, we will also feed people, as well as have better-quality produce for the market.

Second, it is important to feed the farming family. The tragedy of industrialised globalised agriculture is that while commodity markets grow, people starve. More than a billion people are now permanently hungry. Most of them are from rural areas. Many of them are food producers. They are denied food because their soils have been desertified; because chemical agriculture and costly seeds have got them into debt; because they are growing cash crops such as cotton and coffee, which bring no income; because a globalised food trade has pushed down farm prices or they because they have been pushed off the land.

It is criminal that our 'annadatas', our food providers, should themselves go hungry. That is why every producer-family at Navdanya first grows healthy and nutritious foods for the household, and trades only in surpluses.

The third principle is to provide local food for local communities. Everyone must eat. If local communities do not eat what is grown locally, their food will come from somewhere far away. It will also be more contaminated and adulterated, and less safe. If local communities do not eat local produce, biodiversity will disappear from our farms and cultural diversity will disappear from our diets, making both the land and its people poorer.

Finally, long-distance trade and exports must be restricted to unique products. Every culture on Earth has evolved its own unique diet according to its particular ecosystem. As far as possible, food staples must be grown locally, both to produce what the ecosystem is best suited for and to produce what local cultures have adapted themselves to.

It is wrong, culturally and environmentally, to grow temperate-zone vegetables in the tropics and fly them back to rich consumers. Thus trade in food must be restricted to what cannot be grown locally, what is of high value, yet has a small ecological footprint in terms of land and water use.

Spices are a perfect candidate for long-distance trade. Only tiny quantities are needed to add flavour to food, and they tend to grow in very specific ecosystems. They give high value with low volumes. This benefits the producer who can also grow food. In Karnataka, spice-growers use 10 per cent of their land for spice gardens of pepper, cardamom or areca nut, and 10 per cent for paddy for local consumption. These gardens have existed for centuries and are a model for farming that supports trade but is not destroyed by trade and commerce.

Small farmers the world over are not merely producers of commodities; they are protectors and custodians of our vital and collective natural heritage – our soils, our biodiversity, our water and even our air. They are providers of food and nutrition security for rural families and all society.

When agriculture is co-opted by global corporations, farmers are driven off the land, the environment is polluted and food security is threatened. It is time for us all to acknowledge the intimate connection between the globalised food system, the number of farmers being pushed out of farming, the number of species disappearing, the increase in greenhouse gas emissions and the number of children that die of hunger.

Dr Vandana Shiva is a physicist, ecologist, activist and author. For more information on the organic farm at Navdanya, visit www.navdanya.org

THE FUTURE OF FOOD

The way we currently feed ourselves is as unsustainable as our lifestyles, but **Joanna Blythman** takes heart from the food changes of the future

It's 2008, and feeding ourselves has never been easier. We take for granted a supply of every agricultural commodity on the planet, 365 days a year. Food is cheap. Never in living memory have we spent less on it as a proportion of our total expenditure. Even our poorest citizens can afford the luxury foods of yesteryear, like salmon and chicken.

Where our great-grandparents, grandparents and parents fretted about not having enough to eat, that thought has never crossed our minds. We take a constant, reliable flow of food so much for granted that we squander it. Our forebears abhorred waste and revered what was known as 'domestic economy'. We routinely bin uneaten a third of the food we buy, without giving it a second thought.

But roll the clock forward to 2018 and the picture is beginning to look dramatically different. The era of plenty is coming to an end. Two over-arching imperatives are redrawing our food landscape: climate change and a chronic shortage of fuel. Soon we will need to wake up to the fact that the way we have been feeding ourselves for the last two decades is not sustainable and start re-skilling ourselves for a new food century.

The writing is on the wall. Already there are food shortages, catalysed by climate change-induced drought and flood, and exacerbated by the growing taste around the world for a more globalised, Western-style diet. So far, in affluent Northern countries like ours, the change manifests itself in the cost of food – everything from wheat to milk and meat is clocking up major price-hikes. As yet still a spectre in affluent countries, food insecurity looks sure to assume more corporeal form in the future. Riots have been sparked in poorer countries like India and Mexico as the staples on which people rely become unaffordable.

Now a barrel of oil has hit the $100 mark and we have or are about to pass the 'peak' of world oil output, after which production is on a downward trajectory. This means that the abundant fuel supply that kept our complex food chain going is about to hit the skids. Heated, indoor intensive sheds for livestock; hi-tech factories churning out cutting- edge convenience foods; supermarket juggernauts, 24-hour superstores and refrigerated distribution centres; flights carrying food cargo from exotic countries; farmed salmon that owe their flabby weight to fish-oil pellets – all these are going to be vulnerable because they guzzle energy profligately and so will become ruinously expensive.

> 'The era of plenty is coming to an end. Soon we will wake up to the fact and start re-skilling ourselves for a new food century'

What will life be like? Radically different, certainly. The whole business of how we go about feeding ourselves will have to change. But far from being a painful, gloomy reversal of food 'progress', it could see us eating, shopping and cooking better than we do now, and deriving much more pleasure from it.

At the core, in place of the centralised, highly concentrated food supply system we have at present, smaller, more localised food networks or 'webs' of mutually supporting food producers and consumers will come into their own. When fuel is scarce and expensive, being in close proximity to an independent baker, cheesemaker, farm-shop or farmers' market, or on the circuit for a horticultural box scheme, is going to seem a lot more useful and promote more of a sense of food security, than relying on a car to drive miles to the nearest supermarket.

This will give a huge boost to native farmers and growers who, in our current globalised, oil-dependent food economy, find themselves undercut by cheaper, lowest common denominator imports. We could expect to see fewer pesticides sprayed on our land, too, because many of these depend on petrochemical byproducts. This would provide an incentive for food producers to jump off the chemical treadmill and adopt forward-thinking, environmentally sustainable farming methods that enshrine traditional farming knowledge like outdoor rearing, crop rotation and companion planting.

All the alternatives to supermarket monoculture currently sidelined by defenders of the food status quo as precious and highly marginal outlets for the neurotic rich, could become mainstream, unremarkable – just plain sensible. The greengrocer who has been buying from local growers will be in a much better position than the one who is totally reliant on deliveries from the wholesale market. The relocalisation of food production and distribution would dismantle the handicap currently faced by local, independent shops and small- or medium-sized producers who have effectively been annexed from the mainstream food supply.

Pubs and institutional catering

establishments that currently stud their menus with bought-in, factory meals to cut down on staff costs, will begin to find that it is cheaper, and more reliable, to source local unprocessed food and pay someone to cook it. Likewise, it could become more economic for schools to employ a proper dinner lady than to buy in a cold-store of Turkey Twizzlers.

The same economic rethink would apply to home-cooking. When it becomes harder – and exceptionally costly – to commute long distances to work because of crippling transport costs, more people will work at home, or clock off earlier and spend more time there. With this new centre of gravity in our lives, it could become more practical to make some soup from local vegetables than to get to a supermarket selling erratic supplies of expensive ready-made equivalent.

The workaholic lifestyle, which reduces the importance of food to fuel and cheap calories, and condemns us to rush to get everything to do with it over and done with as quickly as possible, faces a setback. Cooking is much more feasible at home, and there are many more time slots to fit it in throughout the day.

Self-reliance will never have been more attractive. Baking decent bread at home could become preferable to paying over the odds for industrial pap. The possibility of more leisurely, communal, homemade meals would provide an opportunity for us to discover some of the conviviality of dining that we find so attractive in countries like Italy and France.

All the old methods of stockpiling food and capturing seasonal gluts – salting, pickling, maturing, conserving, freezing – will be handy skills to have, offering a reassuring sense of self-reliance in uncertain times. As we turn down the central heating thermostat for fear of the next fuel bill, we may feel more inclined to revive the traditional cold pantry than run a massive fridge to house the contents of a once-a-week, non-stop shop.

By default, we will embrace the seasons again, letting local availability determine the bulk of what we eat. We will still want lemons, bananas and other imports we can't grow, but cheaper English cider vinegar will make a lot more sense than pricey Italian balsamic, and parsnips flown from Australia in May will seem quite ludicrous. It should go without saying that by eating more home-cooked food made from fresh, seasonal ingredients at their nutritional peak, and by avoiding the battery of additives and profit-driven manipulations of processed food, we can expect a sharp, perceptible improvement in the nation's health.

Out go the hard-landscaped gardens with rainforest decking and carbon-spewing patio heaters; in come green gardens, allotments and potagers, well known to promote physical fitness and mental wellbeing. When gaps start to appear on supermarket shelves where all those Israeli herbs and hothouse tomatoes used to be, it will be comforting to know that there is parsley and tomatoes in the garden. When we are less car-dependent and more actively involved in food production and preparation, night classes explaining how to keep your own chickens may appear a damn sight more pertinent than Keep Fit.

'Buy local first, home-produced (British) second, Europe third and world fourth,' could be the new pecking order informing shopping habits. As a result it would be infeasible for Britain to become a primarily vegetarian nation. There is no escaping the fact that globally, feeding grain to livestock is an extraordinarily inefficient and wasteful way to produce food, nor that methane from farm animals contributes considerably to global warming. But in the UK, we have whole swathes of grass and marginal land not suited to growing fruit, vegetables or grains. Our country is ideal for the outdoor rearing of livestock and a switch to vegetarianism necessarily ignores much of the fine produce on our doorstep in favour of unsustainable imported foods. Why drink Brazilian soya milk when you can buy high-welfare, British organic cow's milk? We don't have olive groves but we do have cows that can give us butter.

In a greener food world, while the bulk of what we eat would be plant food, we would still eat meat, dairy, eggs and poultry, savouring it in small amounts and wasting nothing. That means ditching the last 50 years' worth of hybrid livestock designed to be protein-generating machines fattened on mountains of grain, and reviving our time-honoured, slow-maturing native breeds.

Rising energy costs making industrialised, over-processed, over-packaged products less financially attractive could lead to a long-overdue simplification of the nation's understanding of just what constitutes healthy eating.

We are currently stuck in a confusing and dispiriting minefield of 'low this, high that, no this, no that' claims where every product has more labels and traffic lights than a boy scout has badges. This has complicated our understanding of something that ought to be simple – feeding ourselves – and created fertile territory for the industries that created the problems to market their chameleon products as solutions to those problems.

In our newer, greener food world, calorie-counting, fat-avoidance and body mass index calculations give way to one blindingly simple and holistic public health message: avoid processed food and base your diet around home-cooked, fresh, local, seasonal, unprocessed food.

The looming environmental crisis is going to force a radical change in the unsustainable, crazy way we have been feeding ourselves. If we can respond to that challenge rather than sitting around waiting for some technological fix to bail us out at the eleventh hour, then our food future looks very much brighter.

Joanna Blythman is an investigative food journalist and author of *Bad Food Britain* (5th Estate)

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Contents

56 **In Season**
Visit a city farm, wander among wild daffodils, cook with seasonal ingredients and witness a total eclipse of the moon – all in March. By **Laura Sevier**

58 **Eco fashion photo story** words by **Matilda Lee**
- Slow clothes: Designed and made to last
- 'Reclaimed to wear': Giving new life to unwanted items
- Ethical trade: Putting the ethics into aesthetics
- Eco fabrics: What are the green alternatives to petrochemical-based synthetics?
- Organics: Helping people and planet

63 **Estethica eco designers**
London Fashion Week's Estethica exhibition profiles the very best in eco design, from ready-to-wear to the ultimate environmentally friendly accessories

66 **The poetry of compost**
Paul Kingsnorth discovers the sublime in a heap of rotting food matter and reveals why – although it may look like nothing more than a pile of brown sludge – compost is the very fount of life itself

68 **Water wisdom**
Should we be saving water even when it's raining? What are the most water-hungry devices? Should we be filtering our tap water? **Laura Sevier** explains how to get water-wise with the world's most precious resource

70 **Bread rebel: Michael Goetze**
Laura Sevier meets the baker who founded the All Natural Bakery, and whose 'slow' loaves go deliciously against the industrial grain

★ READER OFFERS

74 Daylesford Organic: Free postage and packing worth £5.95
75 Abel and Cole: Cook book offer
76 Earth Friendly Products: Eco-cleaning samples
80 Adili: Free organic skincare product
82 Lavera: Free starter set worth £8.50

Editor's letter

Firsts in fashion are hard to come by. In an industry that gets its oxygen from change, something needs to be more than simply 'new' to raise an eyelid. Eco fashion has a first this season: a fashion photo story featuring clothing and accessories by London Fashion Week's Estethica eco designers. The photo story illustrates the issues for which these cutting-edge designers are fighting, from 'reclaimed to wear' to ethical trade.

But eco fashion is not solely about issues. A picture is worth a thousand words and what this shoot does is put the whole genre beyond the fringe, proving, above all, that this is clothing that can stand on its own. Jasmine Guinness is the perfect model to show off eco fashion's sexy, sassy and yes, serious sides.

Taking a bite out of the industry's most profligate practises isn't easy, and eco designers should be commended for holding fast to their principles in putting sustainability on the agenda and for designing with the planet in mind. As they have proved, working with a conscience does not limit creativity or good craftsmanship.

While eco designers' fashion-consciousness makes a statement about the industry itself, it is safe to say that lightening fashion's footprint has never been so desirable.

Matilda Lee,
Green Pages Editor
greenpages@theecologist.org

Fair Trade jersey; biker jacket by Article 23; skirt by Shyam Narayan Prasad; shoes made from offcuts by Nina Dolcetti

Cover image
Model Jasmine Guinness wears a Mark Liu offcuts top and Fifi Bijoux earrings **Photography** Matthew Eades
Make-up Kay Montano using Organic Glam **Hair** Johnny Sapong using Aveda **Stylist** Kira Jolliffe **Art Direction** Sam Franks

March

BY LAURA SEVIER

Ecotips:

1 Collect rainwater (see p 68)
2 Purify the air in your house with a plant
3 Declutter – see **www.freecycle.org/group/uk** or **recyclenow.com**

30 March
British Summer Time begins
Set clocks forward an hour

Wildlife to watch

- Mad March hares (female hares resisting the advances of amorous males).
- Wild daffodils in woodlands.
- Furry looking catkins of the Pussy Willow, found in damp places – a sure sign of spring.
- Blackthorn, also known as sloe – look for clouds of white blossom on dark, thorn-laden branches in hedgerows.
- Migrant summer birds such as the chiff-chaff (a small green woodland warbler).

www.whentowatchwildlife.org

Pick of the month
PAI: Macadamia & Rose Dry Skin Cream

Ideal for cheering up tired, pasty skin, this rich organic cream, hand-blended from pure, plant-based ingredients, will nourish and moisturise dry or mature skin. The macadamia nut oil keeps skin soft and supple – it contains palmitic acid, an oil naturally produced by the skin, which depletes as we get older. The rose helps retain moisture. **www.paiskincare.com**

Herb of the month
Mint

A wonder-herb that relieves stomach and digestive problems, relaxes the mind and can ease headaches, fresh mint is highly versatile. It goes famously well with roast lamb; chopped up it can add a fresh zing to salads and spring greens; infused in boiling water it makes a refreshing mint tea. A hardy perennial, it's an easy herb to grow in the garden and will thrive in sunny and shady spots, as well as in pots. Find out more at **www.herbexpert.co.uk**

March outdoors

Farms in the city

At one of London's 15 city farms you can meet goats, pigs and geese, ride ponies, go for a ramble, take picnics or eat at the farm café. The farms are community-managed projects that bring green space to inner-city areas. Most are free to visit, see **www.london.gov.uk/young-london/teens**

Explore the natural world

Learn more about the birds and butterflies, flowers and fungi, mountains and seashores of the UK. This year the Field Studies Council has more than 500 natural history courses on offer, set in stunning locations from South Devon to Snowdonia. See **www.field-studies-council.org/2008**

Isles of Scilly Walking Festival

Visit beaches, coves and spot rare migrant bird species at this seven-day walking festival (24-31 Mar). A variety of local experts will lead over 20 walks. Springtime is a lovely time to visit the Scilly Isles, with golden fields of narcissi in flower. See **www.walkscilly.co.uk/theevent.html**

Green buildings

1 Mar: Green Architecture Day

An annual event in Brighton featuring stalls, exhibitions and illustrated talks by designers, practitioners and professionals. See **www.brightonpermaculture.co.uk**

28-29 Mar: Homes For Good

Find out about constructing buildings with local, natural materials; energy efficiency and renewable energy technology, as well as organic gardening at this Somerset exhibition of sustainable homes and garden. Royal Bath & West Showground, Shepton Mallet. See **www.homesforgood.info**

Take a CAT course

The Centre for Alternative Technology in mid-Wales offers a variety of short residential courses to help you learn more about sustainable ways of living. Courses in March include Heating with Wood (29 Feb-2 Mar), Ecological Building from New (7-9 Mar), Wind Power Systems (18-22 Mar) and Timber Frame Self-Build (25 Mar-04 Apr). See **www.cat.org.uk/shortcourses**

20 March

Spring equinox... The first day of Spring!

18	19	20	21	22
25	26	27	28	29

21 Feb

Total eclipse of the moon

A chance to witness the moon turn a deep, dark red, this total lunar eclipse is visible over the Americas, Europe, Africa and western Asia. In the UK at around 1.50am, the shadow of the Earth will begin to cross the moon's surface. At 3 am the final phase of the total eclipse begins, when the moon is fully within the shadow of the Earth. See **www.eclipse.org.uk** for more information.

12 March

Vandana Shiva talk

Meet the Indian physicist, philosopher, feminist and environmental activist. Vandana Shiva (below) has been involved in the women's campaign against the destruction of the Himalayan forests and now works in the movement to protect biodiversity and prevent the patenting of seeds in India. In 1984, she founded Navdanya, an organisation that works for organic farming methods, biodiversity, India's small farmers and the Earth. At Schumacher College, Totnes, Devon, 8pm. **www.schumachercollege.org.uk**

Email: laura@theecologist.org with upcoming events for In Season

Website of the month

www.welovelocal.com

Are you searching for a local butcher, a baker, a plumber or somewhere nearby where you can take your shoes to be repaired? This site is designed to make it easier for you to find and use local businesses – simply type in your postcode and a description of the service you're looking for. Businesses can sign up for free web presence.

welovelocal.com

Food in season

Broccoli (purple sprouting)
Cabbage
Carrot
Cauliflower
Chard
Chicory and endive
Garlic (wild)
Leek
Lettuce
Mint
Nettles
Parsley
Radish
Rhubarb (forced)
Sea kale
Sorrel
Spinach
Spring greens
Spring onion
Turnip

3 ways with sorrel

Sorrel occurs widely in the wild around this time of year and tastes best before it flowers in the early summer. The spear-shaped green leaves have a sharp, lemony flavour. Use the leaves to:

1 Add piquancy to soups, stews and salads.

2 Make a green sauce to accompany meat and poultry.

3 Add them to an omelette, or wilt them like spinach and serve with a poached egg.

SLOW CLOTHES

We live in an increasingly throwaway culture, where much of our clothing purchases are discarded after six months, where the average woman spends £13,000 over a lifetime on clothes she doesn't wear, and less than two per cent of what we spend on clothing goes to their repair and cleaning. New fashions come and go at a faster pace than ever before – now that collections can be turned around in a matter of weeks, some retailers have up to 15 'seasons'. Such 'fast fashion' clothes are produced with little care, using low-quality fabrics. As eco designer Kate Fletcher says, 'Fast isn't free – someone somewhere is paying. Fast fashion is disconnected from everything, from poverty wages to climate change. Slow fashion is not time-based, it is about producing, designing and consuming better.' Slow clothes are designed and made to last, outliving fast, fickle fashion trends.

RECLAIMED TO WEAR

As much as two million tonnes of consumer clothing waste is generated in the UK each year. Two-thirds of this goes to landfill, while only 16 per cent is recovered – most of which is exported overseas. To ensure that 'end of life' equals the 'beginning of the next life' we need more producer responsibility schemes, a much higher tax on landfill, and education and awareness of the impacts of our throwaway culture. Positive moves to address the issue of waste in the fashion industry are being made by designers such as Orsola de Castro and Mark Liu, who use fashion industry off-cuts, as well as Gary Harvey, Junky Styling, Nahui Ollin and shoe designer Terra Plana. Reclaiming and recycling also extends to things such as plastic bottles, old quilts and even sweet-wrappers – all of which have been used to make stylish clothing and accessories. Whether it's 'upcycling', 'zero waste design' or 'reclaimed to wear', eco designers are giving recycling a real edge.

UK charity shops resell as few as 8% of the clothes they receive; most are exported overseas.

Dress made from recycled babydoll nighties by Gary Harvey; wool sweater by Izzy Lane; black heels by Sui Generis; bracelet and earrings by Pippa Small for MADE; scarf stylist's own

Ethical Trade

From just-in-time sourcing to celebrity-fed fast-fashion trends; from the rise of the £3 jeans to the rise of special 'Export Processing Zones' (industrial parks offering incentives of flexible, benefit-free and union-free labour to those investing in poor countries), retailers and manufacturers are demanding more and quicker clothing production. It's no secret that those made to pay the price lie at the bottom of the international garment workforce – the vast majority being young women who work long hours for very low pay. Ethical trade aims to put a stop to this. By ensuring that – from farmers to garment workers – those in the clothing supply chain get a guaranteed fair price for their labour, investment is ploughed back into developing skills and protecting communities. And by ensuring that workers are not subject to bad terms of employment, and that they can defend themselves with unions and collective bargaining, it helps prevent exploitation. Labels such as People Tree, Shyam Narayan Prasad and Nitin Bal Chauhan are all making their mark in expanding ethical trade.

ECO FABRICS

No longer is it sufficient for fabrics simply to wash and wear well – a garment's environmental footprint and whether or not it brings harm to humans or wildlife is now a mark of its quality. As much as 80 per cent of a product's environmental impact is decided at the design stage, so designers can and should consider the impact of the fabrics, dyes and finishes used on their creations.

Eco alternatives to non-biodegradable, petrochemical-based synthetics include fabrics made from eucalyptus trees, beech trees and corn. Hemp is a great eco fabric; it 'breathes', keeping you cool, and is soft, comfortable and yet hard-wearing. As for leather, vegetable-tanned is a better choice than chrome-tanned because it's free of heavy metals and toxins. Ciel, Noir and Stewart+Brown are examples of pioneering labels focusing on eco fabrics.

POLYESTER IS NOT BIODEGRADABLE. DUMPED IN LANDFILLS IT WILL BE WITH US FOR ABOUT ANOTHER 200 YEARS.

This page: Organic cotton hoodie by Katharine E. Hamnett; leather skirt by Noir, shoes by Sui Generis
Left: Coat and hemp satin trousers by Ciel; refashioned hemp top by Junky Styling; shoes and purse from Beyond Skin

ORGANICS

Cotton is not the natural fibre we believe it to be. Conventionally farmed, it is one of the world's dirtiest and most lethal crops, accounting for 16 per cent of global insecticide releases – more than any other single crop. There are three million pesticide poisonings a year, causing some 20,000 deaths among agricultural workers.

The benefits of organic farming include: increased income and better health for cotton farmers; premiums paid for organic cotton; better long-term yields and more say for farmers and farming communities. It is also better for the soil and the environment.

As a designer, using organic cotton means benefiting both people and planet.

THE MARKET FOR ORGANIC TEXTILES IN THE UK IS GROWING AT **50%** A YEAR.

Coat and t-shirt dress by FIN; coin earrings and cuff by Pippa Small for MADE

AMANA
www.amana-collection.com

ARTICLE 23
www.article-23.com

CIEL
www.ciel.ltd.uk

DEL FORTE DENIM
www.delforte.com

ENVIRONMENTAL JUSTICE FOUNDATION
www.ejfoundation.org

FIN
www.finoslo.com/en

FROM SOMEWHERE
www.fromsomewhere.co.uk

GREEN KNICKERS
www.greenknickers.org

IZZY LANE
www.izzylane.co.uk

JUNKY STYLING
www.junkystyling.co.uk

KATHARINE HAMNETT
www.katharinehamnett.com

MAKEPIECE
www.makepiece.co.uk

MARK LIU
www.stique.com

NITIN BAL CHAUHAN
Email: nitinbalchauhan@gmail.com

NOIR
www.noir-illuminati2.com

PEOPLE TREE
www.peopletree.co.uk

SHYAM NARAYAN PRASED
Email: shyamnp@yahoo.com

STEWART + BROWN
www.stewartbrown.com

VIRIDIS LUXE
www.viridisluxe.com

BEYOND SKIN
www.beyondskin.co.uk

FIFI BIJOUX
www.fifibijoux.com

FLYING COW
Email: showroom-takao@libero.it

NAHUI OLLIN
www.nahuiollin.com

PIBIONES
www.pibiones.com

SONYA KASHMIRI
www.sonyakashmiri.com

TERRA PLANA
www.terraplana.com

VEJA
www.veja.fr

THE poetry COMP

Your compost heap can be an untapped powerhouse of energy, says **Paul Kingsnorth** – it's just a matter of learning to harness it

I am writing this in the depths of winter. Snow is forecast for tomorrow. I haven't been down to my allotment for a while: there's not much to do there, other than pick my winter rations – kale, leek, broccoli, parsnip and spinach – and bear them home for the pot. The pigeons are still valiantly battling against my netting and trying to beat me to it. A rat has taken to living in my shed and eating my bone meal fertiliser. The occasional fox passes through. In the deep midwinter, however, little else stirs. The frogs are hibernating; next year's slugs are yet to be born; most of the insects can't cope with the cold. All is calm.

Except in the corner by the shed. Here, hemmed in with pallets and wire, is the liveliest part of the allotment; the part that lives and works and moves and grows even in the deepest, darkest months: the compost heap. To you – and indeed to me – it may simply look like a pile of brown sludge, rotting food waste, cut grass, bits of torn-up cardboard and the remains of last week's dinner, but this is where it all happens. This is the fount of life itself. This is the base from which the soil is renewed and life given back to the exhausted earth. Without this, there would be no food. This is the ultimate in recycling, the ecological principle made concrete.

I may sound like I'm proselytising, but that's not quite right: there's nothing prosaic about a compost heap. What happens within it is pure poetry. A collection of disparate elements is gathered together and re-ordered into something new. A magical, semi-understandable process takes place that transmutes useless or discarded substances into something precious and life-giving. All of life's miracles are on show in this small, smelly square of your land.

Maybe it sounds as though I'm talking this up a bit, but any food grower will know what I mean – will know the value of this key element in the ecosystem of the vegetable garden. A good compost heap is the key to growing good food. If you can create enough quality compost, rich in nutrients, and dig it into your soil to refresh its health after the year's crop has taken out some of its goodness, then your chances of growing yourself some fantastically tasty produce are high indeed. Conversely, no compost and no soil renewal will lead, over time, to exhausted soil which produces little of any use.

In this, the creation and maintenance of a good compost heap – and the dire consequences of not creating and maintaining one – are a pleasing metaphor for the state of the planet and humanity's duty to care for it. Take out more than you put in and expect to pay a price – realising as you do so that the Earth is not inexhaustible and that your actions have consequences.

Fortunately, making compost is not quite so dramatic as this – and neither, actually, is it as complex as the magic that goes on within it might suggest. Some people get into a real tizz about compost. I've met some serious compost snobs in my time; people who think that making the good stuff is an art (they may well be right here) that can only ever be truly given form by an elite who have served a long apprenticeship. Similarly, I have met food-growing

OF POST

virgins who are anxious to the point of physical symptoms about whether they will be able to get their compost heap 'right'. They've read books or articles that make the process of creating compost seem so complex it seems easier to buy it from someone else – or buy the food instead.

The good news is that none of it is as hard as some would like to suggest. Making good compost is actually pretty easy, and is infinitely perfectable. You just keep fiddling about with the recipe, year after year, until you get it right. Mine isn't perfect, but my veg grows just fine. Most of the hard work, after all, is done by the worms and the microbes, while you sit at home.

Compost, in essence, is very simple. Dead plant matter rots. Pile enough of it up together, mix it up so that air infiltrates the heap, and the bacteria feeding on it and making it rot will produce nitrogen and other goodies that the soil – and your veg – needs to grow healthily. Your task then is simple: chuck enough waste matter of the right kind on your compost heap (vegetable scraps, for example, but no meat). Turn it regularly then leave it for a while – from a couple of months to a year, depending on how much of it there is and what the conditions are. Then mix the remaining goo into your soil.

I say 'goo', but what you should end up with (according to the books) is a dark-brown, crumbly substance that looks a bit like soil and smells 'sweet'. My compost, I have to admit, is never quite like this. Sometimes it is gooey – which means I haven't mixed enough roughage in with my kitchen waste and should probably be adding more grass clippings, paper or cardboard – and sometimes it has lumps of undigested potato in it. This means I should be chopping things up smaller before I throw them in, or turning the heap more often so the bacteria have easier access.

I'm no expert, you see, but I get better every year. The key to success, as with everything in food growing, is four simple words, which you should carve above the lintel of your shed: *Do not be afraid*. At its heart, making compost, like growing food itself, is easy and wonderfully fulfilling. It's not about being perfect, it's about having a go – and eating the results. Above all, it's about enjoying yourself. And if you can find the sublime in a heap of rotting food matter... Well, you know you've got there.

> My own compost isn't perfect but my veg grows just fine. Most of the work is done by the worms, while you sit at home

Need organic meat and fish to go with your veg? See the listings on **p 73** of our shopping guide

Tips and resources

Composting: An Easy Household Guide by Nicky Scott (Green Books) tells you everything you need to know about composting.

Compost bins
Nicky Scott recommends:
Inside: You can start composting indoors with 10-litre caddies, bokashi bins (the bokashi mix helps cut out the smell) and wormeries. Visit
www.wigglywigglers.co.uk
www.recyclenow.com
www.recycleworks.co.uk
www.westcountryworms.co.uk
Outside: Make or buy various types of compost bin, such as Green Cone bins (www.greencone.com), Jora 270 bins (www.smartsoil.co.uk) and traditional compost bins (www.organiccatalog.com).

For more information
The Compost Associaton
www.compost.org.uk
Waste and Resources Action Programme (WRAP)
www.wrap.org.uk
or call their home composting hotline on 0845 600 0323
Garden Organic
www.gardenorganic.org.uk

Contact me

With questions, comments or anything you think I should know about. Email growit@paulkingsnorth.net

• All my previous columns on allotments and food growing are collected on my website at www.paulkingsnorth.net

Liquid blue gold

It is one of the world's most precious resources, and yet we are using more of it now than ever before. **Laura Sevier** reports on why we shouldn't be taking our water for granted, as well as offering some easy ways to avoid wasting it

Demand for water is growing. In the UK we use some 150 litres of water a day, enough to fill 15 buckets and almost 50 per cent more water than we used 25 years ago. Water-hungry devices such as power showers, dishwashers and washing machines are largely responsible for this surge in water use. The question is, should we be worried? Living in a country where drizzle, downpour and occasional flooding are the norm, and where water is so cheap and available – at only £1 per 10,000 litres – we can afford to take our plentiful water supply for granted, right?

Wrong, according to Waterwise, an independent UK NGO that is focused on decreasing water consumption. The UK has less available water per person than any other EU country apart from Belgium and Cyprus. London is drier than Istanbul and, due to its high population and low rainfall, the south-east of England has less water available per person than the Sudan or Syria. Even after the summer of 2007, the wettest since UK national climate records began in 1914, Waterwise says there are still low groundwater levels across south-east England.

Saving water will ensure the water we do get lasts and reduce the pressure on the water supply – as well as on the environment. According to a 2003 WWF survey, for instance, more than 500 wetlands in England and Wales are drying out due to decades of over-abstraction. Wetlands play a valuable role in safeguarding water supplies for people and wildlife alike.

'Whether there is a drought or not, people still need to save water,' says the Environment Agency's Lisa Beechey. 'We need to save it in the long term – it's about preserving precious resources.'

Especially when you look at the bigger picture. The expected increase in global water use by 2020 stands at 40 per cent, according to the UN. If the world continues consuming water at the same rate, an estimated 2.7 billion people will face severe water shortages by the year 2025 (1.1 billion worldwide already lack access to clean drinking water). Water may cover 70 per cent of the planet, but 97 per cent of that is undrinkable seawater. Another two per cent is locked up in polar ice caps, leaving just one per cent for human use – half of which is polluted. It's high time we started treating water as blue gold.

> "The UK has less available water per person than any other EU country apart from Belgium and Cyprus

What you can do

Water meters can be useful for raising awareness of how much water you are using. It costs nothing to switch to metering and anyone can ask their water company to install a free meter. Depending on your water usage and circumstance, a meter could save you money on your water bill. A survey carried out by Uswitch (www.uswitch.com) showed that some families could save up to £150 a year by installing one . But you don't need a meter to realise that the real key to water efficiency is reducing waste.

So, starting with the taps, follow this guide to saving water...

Bathroom

- **Taps**: A recent survey carried out by Which? found that nearly 40 per cent of adults still leave the tap running while brushing their teeth (wasting over six litres per minute). We could save enough water to supply half a million homes if we all turned the tap off. A dripping tap wastes at least 5,500 litres of water a year – enough to fill a paddling pool every week for the whole summer – so replace the tap washer and save around £18 a year.
- **The art of flushing**: A quarter of all drinkable water we use in our homes is flushed down the toilet. Fit a water-saving 'Hippo' or 'save-a-flush' device in your cistern to cut the amount of water you use when you flush. Your water company may supply it for free. If you're buying a new toilet, go for

one that is water-efficient or has a dual flush. See www.waterwise.org.uk

• **Baths or shower?** A bath can use up a lot of water (over 100 litres), while a standard shower only uses a third of the amount. Power showers actually use more than a bath if you're in them for more than five minutes.

Kitchen

• **Dirty dishes**: Hand-washing dishes using a bowl instead of under a running tap saves up to 20 litres a day. A modern dishwasher can use as little as 15 litres of water per cycle; older models can use up to 50 litres.

• **Washing machines**: A full load uses less water than two half-loads.

• **Need a new dishwasher or washing machine?** Go for a water-efficient model. Visit www.waterwise.org.uk to see which machines are the best.

• **A cool drink**: Fill a jug with tap water and put in the fridge to avoid running taps for ages just to get a cold drink.

• **Fruit and veg**: Wash in a bowl instead of beneath a running tap, then use the leftover water to feed your plants.

Five top tips for the garden

• **Soak n' mulch**: In dry weather, soak the roots of your plants once or twice a week – it's better than lightly watering them every day (unless they are new plantlings) because most of that water evaporates. Mulches such as pebbles, gravel, chipped bark and grass clippings will keep water-hungry weeds away, cool soil , decrease evaporation and feed your plants.

• **Sprinkler etiquette**: Sprinklers can use as much as 1,000 litres of water per hour – more than a family of four can use in a whole day. Either use your sprinkler early in the morning or late in the evening. Less water will evaporate and more gets to the roots.

• **Watering cans**: Just 30 minutes with a hosepipe will use more water than the average family consumes in a day. Use a watering can instead, or consider fitting your hose with a trigger-gun to control the flow.

• **Used water**: Use 'grey' water (waste water from baths, sinks and so on) to water your garden flowers, but don't use it on edible herbs or veg. If it contains strong detergents, don't use it at all as it might damage your plants. You can divert used water from your bath or shower directly into a water butt with a Bath Water Diverter, available from www.naturalcollection.com

• **Harvest the rain**: Buy a water butt to collect the rainwater from your roof. The average roof collects about 85,000 litres of water a year – enough to fill 450 water butts with free water for thirsty plants. 'Harvesting' rainwater also reduces the risk of flooding during storms, acting as a buffer before the water hits the drains. They are priced between £40 and £80, depending on size and material (plastic, wood or terracotta). Using rainwater indoors for flushing toilets or washing clothes is tricky but possible: you just need a bigger tank, a different set of pipes, an electric pump and some filters. It's expensive (£2000 to £3000) but could save you money in the long run, with a payback time of 10 to 15 years. Visit www.rainharvesting.co.uk for details. E

For more information on saving water, go to www.waterwise.org.uk

> "The average roof collects 85,000 litres of rainwater a year, enough to fill 450 water butts

Thinking of investing in a water filter? Find out where to buy one on **p 76** of our shopping guide

Water filters

On the whole, UK tap water is pretty good. According to the Drinking Water Inspectorate, the vast majority of water samples pass industry standards for levels of impurities. But this doesn't make it 100 per cent 'pure'. Tap water is disinfected with chemical cleansers such as chlorine – which can morph into harmful chlorine byproducts (CBPs), some of which are known carcinogens – and aluminium, which has been linked with dementia and Alzheimer's. Fluoride, added to the water supply of around 10 per cent of the UK population, can increase the risk of various cancers, brittle bones and damage the immune system. Other contaminants could include nitrates from fertilisers, pesticides, toxic metals (such as lead and mercury), solvents and pharmaceutical drugs including antibiotics, hormones and chemotherapy chemicals.

Filtering devices can remove a substantial amount of these contaminants. Simple Jug filters (£15-£25)remove chlorine and toxic metals such as lead; some remove nitrates. If you're after filtered water fresh from a tap, go for a plumbed-in filter under the sink. Reverse-osmosis filters (£300-£900) are the most effective and use a fine membrane to filter out water under pressure.

Water distillers (£200-£400) can be fitted under a sink or put on a kitchen surface. Water is boiled and cooled, leaving behind any contaminants – almost all – whose boiling points is above that of water.

Bread rebel: Michael Goetze

The creation of the modern loaf is an industrial process that uses a cocktail of artificial ingredients – but for taste, bite and goodness, nothing beats the old ways. **Laura Sevier** meets a baker bidding to become the saviour of our daily bread

Michael Goetze, the German-born baker and founder of the All Natural Bakery in Bury St Edmunds, Suffolk, is not a fan of British bread.

'Fluffy, slightly sweet and packed in plastic bags – uugghh!' he says. 'It's like children's food: no flavour, easy to swallow and easy to chew – you barely need teeth to eat it.'

Moving to England 10 years ago, he missed his native crusty rye loaf so much he started to bake his own. A former horticulturalist, he had no plans to bake for a living until he bought a mobile wood-fired oven and began to serve hot fresh bread at local farmers' markets. His bread proved so popular he began to supply shops in Cambridge, baking at home with the oven mounted on the trailer in his garden. Now he has his own bakery and employs three bakers, a part-time bookkeeper and two drivers. They make around 1000 loaves a day, supplying 50 wholefood shops in East Anglia and about 50 in London, and all the recipes are Michael's own.

'I follow certain basic principles but I do it the way I like, ignoring the rules about how you should make bread. After all, it might even turn out to be a little bit better than before,' he says. 'The key is to dare to be different, to be more adventurous.'

In order to learn various methods, he's read English, French and German books on the history of breadmaking and has tried out many bread recipes. Wherever possible he uses organic ingredients. Wheat flour is stone-ground at the Letheringsett Watermill, the only working watermill left in Norfolk . 'It would be cheaper to use normal flour but their flour is just unbeatable, and I like the people who run it,' Michael says. He also makes bread from spelt, rye and kamut flour, 'older types of grain that are better for you.'

> Michael and others like him are revivers and preservers of tradition, saviours of the modern loaf

Slow bread

Bread is made in the traditional way with no artificial emulsifiers, preservatives or enzymes. 'I don't use any of these so called bread "improvers",' Michael says. 'We mix the doughs at a low speed and allow them to rise slowly so they can develop maximum flavour. Apart from mixing, it's all done by hand.'

All his bread is sourdough bread made with his own sourdough 'starter' (flour and water fermented in a warm

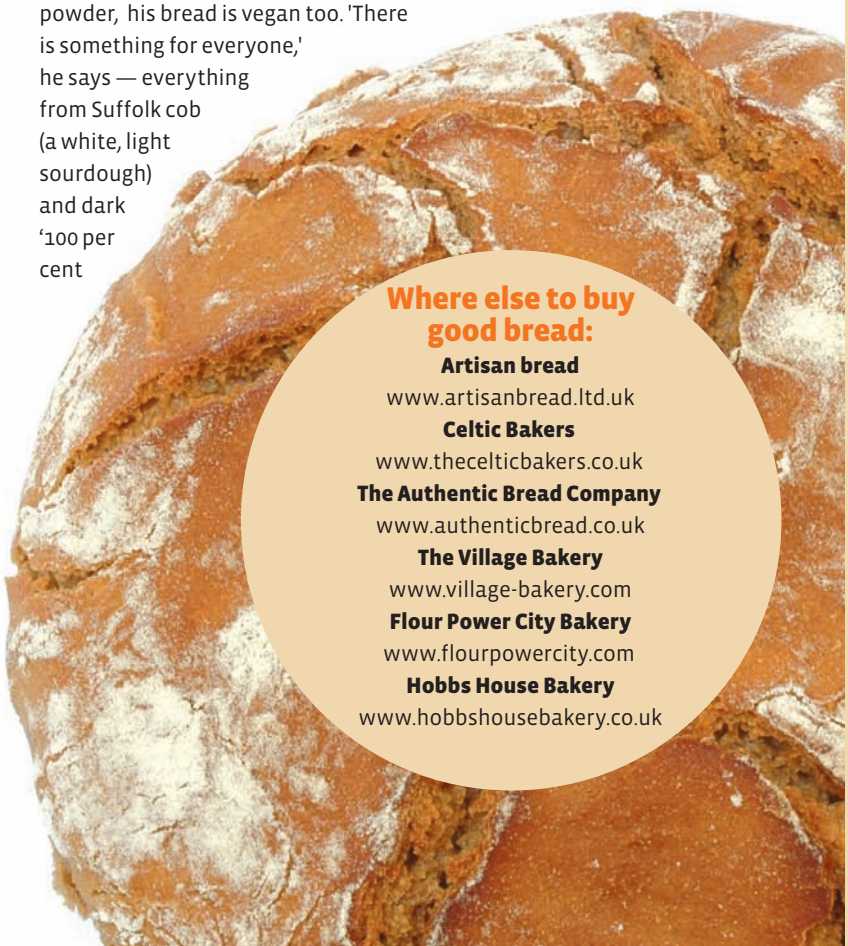
Photography: MARK ANSLOW

place over a period of seven to 10 days, the sourdough culture that forms contains lactobacillus, acidophilus and a range of wild yeasts). The advantage of sourdough is that the bread is easier to digest. The lactobacillus is important for proper digestion of complex carbohydrates and the slow fermentation allows the grains to be 'pre-digested', allowing nutrients to be absorbed and metabolised more easily. A few varities contain a slow acting, artisan baker's yeast but most are yeast free. And, because he doesn't add milk or whey powder, his bread is vegan too. 'There is something for everyone,' he says — everything from Suffolk cob (a white, light sourdough) and dark '100 per cent rye' to speciality breads topped with olive oil and rosemary or Godminster cheddar. Making sourdough loaves can take up to 16 hours. Compare this to a standard modern yeasted loaf, made in just three. Michael's is a breadmaking process that certainly goes against the mainstream grain.

'What I do is a bit old fashioned and romantic,' he says. 'Its long fermentation is a bit backward-looking. You could say I make "slow bread".' Okay, so as an artisan baker may not be in a position to churn out thousands of loaves an hour like a modern industrial plant bakery, but imagine a new wave of small bakeries in villages, towns and cities, providing good, fresh bread on a wide scale...

In an age when our breads are some of the most processed products in the food industry, Michael and others like him are revivers and preservers of tradition, saviours of the modern loaf. His have taste, bite and nutrients that are the result of quality ingredients and a skilled baker. Surely the best thing since unsliced bread? E

For more information, see www.allnaturalbakery.co.uk



Where else to buy good bread:

Artisan bread
www.artisanbread.ltd.uk
Celtic Bakers
www.thecelticbakers.co.uk
The Authentic Bread Company
www.authenticbread.co.uk
The Village Bakery
www.village-bakery.com
Flour Power City Bakery
www.flourpowercity.com
Hobbs House Bakery
www.hobbshousebakery.co.uk

A good loaf is hard to find...

The rise of 'fast bread'

Making bread used to be an art mastered by the local baker, a skilled and patient process of mixing water, flour, yeast and salt; kneading the dough, letting it rise; shaping it, letting it rise and then baking it. These days, however, only two per cent of the bread sold in the UK is made by small craft bakeries; 81 per cent is made by 11 large plant bakeries and supermarket in-store bakeries make the remaining 17 per cent.

The age-old method of bread-making has largely been abandoned in favour of the industrial, high-speed Chorleywood Process. The dough is made in three minutes using intense, high-speed mixing; basic ingredients can be transformed into a sliced loaf in less than three hours. To keep it speedy, as much as three times the amount of yeast you'd find in craft bread is used. Extra ingredients are added: enzymes to help it rise and soften; wheat protein (gluten), emulsifiers and preservatives. There may also be soya to whiten, sugar to sweeten and milk (or whey powder) to soften. The industrial loaf will, by law, be 'fortifified' with artificial vitamins and minerals to make up for the nutrients that are lost in the modern wheat-growing and milling process.

How bread lost its goodness

Grown in a fertile, well-nourished soil, wholegrain wheat is rich in vitamins and minerals. But from seed to harvest, non-organic wheat crops may be sprayed up to eight times with pesticides, fungicides and herbicides. They're also sprayed with Chloremquat, a plant growth hormone that strengthens the wheat straws weakened by nitrogen fertiliser. Wheat is treated with a variety of pesticides in the grain store, too. According to research published in 2005 by the UK's Pesticide Residues Committee (PRC), 53 out of the 72 'ordinary' breads tested were found to be contaminated with residues.

Most commercial flour is roller-milled through steel hammer heads, a process which destroys up to 80 per cent of the nutrients in the grain. The bran and wheat germ are lost, along with many of the vitamins (especially vitamin B), minerals and essential fatty acids. By law, the miller must add back various synthetic vitamins and minerals, some of which may even be harmful. There is evidence, for instance, that excess iron from fortified flour can cause tissue damage.

Stoneground flour (a traditional method in which the grains are rubbed between two stones) or flour milled with slow-speed steel hammer mills retain the minerals, vitamins and essential fats that are lost in other methods of flour production.

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Reader offers

74 Daylesford Organic: Free postage and packing worth £5.95 on all orders

75 Abel & Cole: Free cook book when you spend over £40 on your first order.

76 Earth Friendly Products: Free sample eco-cleaning products

80 Adili: Free organic skincare product worth £10 when you spend over £40

82 Lavera: Free Lavera starter set worth £8.50 on orders over £25

ADVERTISING POLICY Every advertiser featured in the *Ecologist* has been vetted to ensure its products or services don't damage the environment, the people it employs or the consumer

Food and drink

The producers on the following pages supply genuinely fresh, seasonal fruit, vegetables, fish and meat. And in most cases you can order online and have everything delivered direct to your door. You can also feel safe in the knowledge that you're buying environmentally sound, delicious food that supports small, independent producers

Daylesford Organic

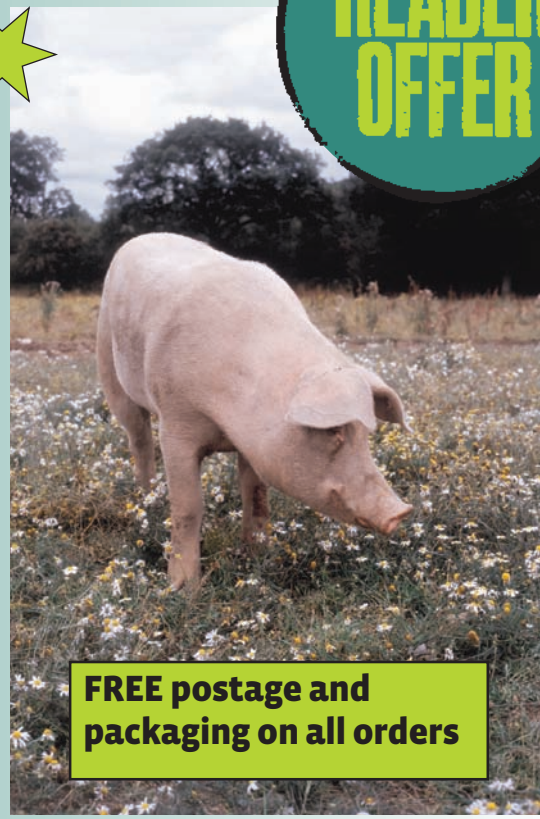
READER OFFER

Daylesford Organic raises its animals naturally and sustainably to the highest Soil Association standards. Ranging freely over organic pastures in the Cotswolds and Staffordshire, they are allowed to mature at their own pace. The result is healthy, organic, free-range meat of award-winning flavour and succulence, hung properly and prepared by the company's master butcher.

Daylesford Organic offers *Ecologist* readers the chance to try its delicious organic meats with free delivery and packaging worth £5.95 on all orders.

Natural goodness, delivered nationwide...

To order your Daylesford Organic chicken, beef, lamb, mutton, pork, venison, organic burgers and sausages in prime condition or to try any of their range of organic produce, call 0800 083 1233 or visit www.daylesfordorganic.com and quote 'Ecologist'. Offer valid until 31/03/08.



FREE postage and packaging on all orders

Picnic

Whether picnicking in the park or in the office, if you want to make sure you are always consuming healthy, organic, sustainable food and drink, prepare it at home and take it with you. The companies listed here stock a range of organic and free-range products, so you won't be compromising your taste buds or your ethical standards

Abel & Cole

READER OFFER

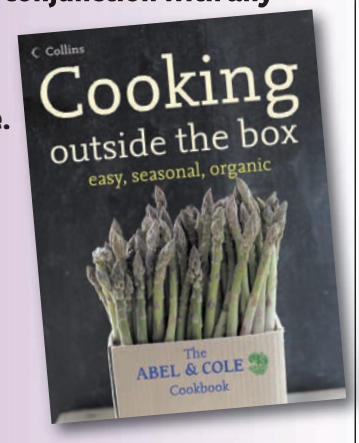
FREE copy of *Cooking Outside the Box* by Keith Abel when you spend your first £40 with Abel & Cole organic deliveries

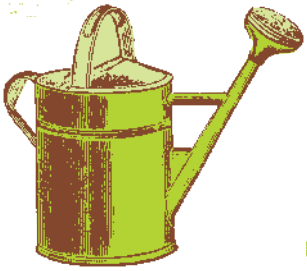
Abel & Cole has been delivering delicious organic food to people's homes for nearly 20 years. Its range includes everything from award-winning British meat, artisan cheeses, fresh bread and organic wines to seasonal fruit and veg. Everything arrives neatly packaged on the doorstep and you don't even need to be in when the goods are delivered.

New customers will receive a free copy of *Cooking Outside the Box* by Keith Abel, worth £17.99, with orders over £40.

'It takes a gentle look at the seasons, at what's best at what time of year and why. It's about how to cook simply' – Keith Abel.

To place your order and get your free copy visit www.abel-cole.co.uk, place an order of £40 or more and enter the offer code ECO1.
Terms and Conditions:
1. Offer valid on first orders of £40 or more only. 2. Visit www.abel-cole.co.uk to see if Abel & Cole delivers in your area. 3. Not valid in conjunction with any other offer. 4. Offer valid until 31 May 2008 inclusive. 5. No cash alternative. 6. Enter the code ECO1 when you set up your account. 7. Subject to availability.





Home and garden

From garden tools to bed linen, cleaning products and furniture – by simply changing our household buying habits we can reduce our carbon footprint and the chemical cocktail that makes its way into our homes. So visit the online producers below for ideas on how to green your home

Earth Friendly Products

READER OFFER

FREE sample Earth Friendly eco-cleaning product When you buy a 3 x 120ml cleaning pack

Earth Friendly Products was founded 15 years ago when John Vlahakis became concerned that the chemicals in the cleaning products he used were damaging the environment. This led him to create a range of 100 per cent natural and effective non-toxic cleaners for home and laundry.

The range of 25 products encompasses all of your household needs, including washing clothes, cleaning dishes by hand or by dishwasher, cleaning surfaces, unblocking drains, polishing furniture and cleaning the bathroom, as well as air fresheners. Made with plant-based ingredients – including corn, coconut, citrus and herbs – the formulas are biodegradable, use natural perfumes and are pH neutral. The whole range is approved by the Vegan Society and won the 2007 PETA Proggy award for the best line in cruelty-free household products.

Try four of Earth Friendly's best-selling high-concentrate products for just £4.50 including packaging and postage. The cleaning pack includes a free sample worth £1.50 for *Ecologist* readers:

- ECOS Laundry Liquid with magnolia and lily, and soya fabric softener 120ml
- Parsley Plus Multi-Surface Cleaner 120ml
- Dishmate Washing-Up Liquid with almond and cherry 120ml
- FREE Floor Kleener with lemon oil, ideal for sealed wood and other hard non-porous surfaces 120ml.

Order online at www.earthfriendlyproducts.co.uk clicking 'Ecologist reader offer', by phone on 01892 616871 or email info@greenbrands.co.uk quoting 'Ecologist reader offer'. Offer valid until 31/03/08.

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Under-the-sink systems
www.freshwaterfilter.com
www.simplywater.com
www.uk-water-filters.co.uk
www.kinetico.co.uk

Filter jugs
www.naturalcollection.com
www.ecoutlet.co.uk
www.ecotopia.co.uk

Home energy

Use your electricity bill to help fight climate change. The Ecologist *and Ecotricity have teamed up to make it as easy as possible to support the transition to clean, locally supplied energy – and we encourage you to take steps at home to reduce your energy demand*

Eco power campaign

How do we meet the UK's energy needs from clean, renewable sources of energy that come from sources as local as possible?

1. Switch to Ecotricity as our energy supplier
2. Reduce our energy demand
3. Localise our energy supply... individually and in our communities

Our current energy sources are non-renewable and increasingly expensive: gas (40 per cent), coal (30 per cent), nuclear (20 per cent) and oil (five per cent). We need to move to non-polluting, small-scale energy sources generated as close to users as possible, such as wind, hydro, solar and tidal.

What's wrong with nuclear?

Dale Vince, founder and CEO of Ecotricity, says, 'Fossil fuels' days are numbered. Nuclear, often held out as the answer to our looming energy gap, is not a renewable fuel. Uranium is finite; its cost has risen tenfold in the past year or so, on the back of increased worldwide usage. It's another fossil fuel story waiting to unfold: mining will peak, demand will outstrip supply and it will one day run out. Renewable energy is the only energy source we can use once and then use again and again, and it's the only sustainable energy source.'

ELECTRICITY

RENEWABLE ENERGY TECHNOLOGIES

British Eco
www.britisheco.com
Dulas
www.renewable-resources.com
HiTech Energy
www.hitechenergy.co.uk

LIGHT BULBS

Lightbulbs Direct
www.lightbulbs-direct.com
Energy Saving World
www.energysavingworld.co.uk
Nigel's Eco Store
www.theinsightecostore.com

SUPPLIERS

Ecotricity
www.ecotricity.co.uk
Good energy
www.good-energy.co.uk
Green energy
www.greenenergy.uk.com

GROUND SOURCE HEAT PUMPS

Conservation Engineering
www.conservation-engineering.co.uk
Eco Heat Pumps
www.ecoheatpumps.co.uk
Geothermal International
www.geoheat.co.uk
Green Systems
www.greensystems.net
Powertech Solar
www.powertech-solar.com

Clothing

The virtual boutiques and retailers featured on these pages stock a range of well-made, stylish and ethical clothes. Precise sizing charts make it easy to find the right size for you – and if something doesn't fit, or you don't like it, simply return it. Being fashionable and being ethical are no longer at odds...

Adili

FREE Trevarno hand salve and soap with every Adili order over £40

READER OFFER

Adili believes it is possible for fashion to be both stylish and made in an ethical and just way, in a way that gives rather than takes from people and planet. Adili showcases pioneering ethical clothing brands that are tackling head-on the ethical issues involved in fashion production.

With a complete re-branding for Spring/Summer season, Adili offers customers more than 65 of the top ethical brands to choose from. Shop for fashion, beauty, accessories and homeware, Adili has something for the most discerning eco-shopper.

Adili have teamed with Trevarno and are offering a FREE organic skincare product worth £10 with every order over £40.

Visit www.adili.com to see Adili's Spring/Summer collection. Order over £40 to claim your free product, quoting 'ecologistspring'. Ends 31/03/08

CLOTHING DESIGNERS

Adili
www.adili.com
Ciel
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Ecobtq
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Natural Store
www.thenaturalstore.co.uk
Pachacuti
www.pachacuti.co.uk
Pierre Garroudi
www.pierregarroudi.com
Sari
www.saricouture.com

CASUALWEAR

Bishopston Trad. Comp
www.bishopstontrading.co.uk
Ecotopia
www.ecotopia.co.uk
Green Fibres
www.greenfibres.co.uk
Howies
www.howies.co.uk
Inbi Hemp
www.inbi-hemp.co.uk
Natural Collection
www.naturalcollection.com
Pakucho
www.pakucho.co.uk
People Tree
www.ptree.co.uk
Schmidt Natural Clothing
www.naturalclothing.co.uk
Seasalt
www.seasaltorganic.co.uk
Terramar
www.terramar.co.uk
The Green Apple
www.the-green-apple.co.uk

Ecotip
Slow down your wardrobe

"Many factors influence a garment's 'speed'," says ecodesign consultant and author Kate Fletcher. (For more on 'slow clothes' see page 58.)

Here are some 'slow' tips:

- Cut out dry cleaning. Many dry clean-only labels can be washed in cold water and a gentle non-biological liquid.
- After washing, hang clothes on hangers to dry. They'll dry quicker and won't need ironing.
- Making your own clothes means you can afford to get higher-quality fabric. Buy from ethical sources or charity shops and remake your own couture. See **www.sew-so-easy.com**
- Instead of hitting the shops, have a clothes-swapping party. Get friends to bring around their unwanted clothes and trade. Take the leftovers to a charity shop or clothes bank instead of binning them - every year in the UK, 900,000 million items of clothing, shoes and accessories are thrown away.
- Cut up the sleeves of old t-shirts that are beyond being turned into pyjamas and make them into hair-bands or dusters.

SHOES

Beyond skin
www.beyondskin.co.uk
Birkenstock
www.birkenstock.com
Black Spot Sneakers
www.adbusters.org
Fair Deal Trading
www.fairdealtrading.co.uk
Freerangers
www.freerangers.co.uk
Green Shoes
www.greenshoes.co.uk
Terraplana
www.terraplana.com
The Natural Shoe Store
www.thenaturalshoestore.com
Vegetarian Shoes
www.vegetarian-shoes.co.uk

ACCESSORIES

Design Africa
www.artworksforafrica.com
Matt and Nat
www.mattandnat.com

Bodycare & cosmetics

The best way to ensure healthy skin is to maintain a healthy diet, get enough sleep and keep stress levels low. If you do buy products for your face or body, try to make sure they are based on natural ingredients. The companies listed here carry products that have not been tested on animals; they contain no parabens, no petrochemicals and no synthetic ingredients

Lavera

FREE Lavera Starter Set when you spend over £25

READER OFFER

Lavera, meaning 'the truth', has been innovating natural skin care since 1987. Produced in Germany, Lavera's award-winning skincare and cosmetics contain the purest organic and natural ingredients. The full range of more than 250 products includes skincare, sun protection, colour cosmetics, face, body, baby and hair care.

Spend over £25 and get a FREE Lavera Starter Set worth £8.50:
1 Wild Rose Cleansing Milk 15ml
1 Wild Rose Moisturising Cream 7.5ml
1 Body SPA Milk and Honey Shower & Bath Gel 30ml
1 Body Spa Milk & Honey Body Lotion 30ml
1 Basis Sensitiv Mild Shampoo 30ml
1 Basis Sensitiv Handcream 30ml

Visit the Lavera website at www.lavera.co.uk to see Lavera's skin-friendly, organic and all-natural range. Call 01557 870203 to place your order, quoting 'Ecologist' to claim your free starter set Offer open to UK residents only. P + P not included. Valid until 31/03/08.

HEALTH & HOMEOPATHY

Ainsworths
www.ainsworths.com
Helios Homeopathic Pharmacy
www.helios.co.uk
Optima
www.optimahealthcare.co.uk
Pure Potions
www.purepotions.co.uk
Revital
www.revital.com
The Organic Health Shop
www.baughdell.co.uk

BODYCARE ESSENTIALS

Akamuti
www.akamuti.co.uk
Barefoot Botanicals
www.barefoot-botanicals.com
Earthbound Organics
www.earthbound.co.uk
Ecotopia
www.ecotopia.co.uk
Essential Care
www.essential-care.co.uk
Finetaste.co.uk
www.finetaste.co.uk
Jo Wood Organics
www.jowoodorganics.com
Life Giving Organics
www.LifeGivingOrganics.com
My Being Well
www.mybeingwell.com
The Organic Pharmacy
www.theorganicpharmacy.com
Pure Nuff Stuff
www.purenuffstuff.co.uk
Pure Skin Care
www.pureskincare.co.uk

PERFUME

Aromasciences
www.aromasciences.com
Ascent
www.hayspace.co.uk
Doima
www.veganvillage.co.uk/dolma
Oshadhi
www.oshadhi.co.uk
Primavera
www.primavera.co.uk
The Soap Tub
www.meltsandpoursupplies.com

MAKE YOUR OWN

Aromantic
www.aromantic.co.uk
Bay House Aromatics
www.bay-house.co.uk
Cosmetics at Home
www.cosmeticsathome.co.uk
New Directions
www.newdirectionsuk.com
The Soap Tub
www.meltsandpoursupplies.com

Ecotip
Back scrub recipe

Avoid chemicals and excess packaging by using sea salt for natural exfoliation and mixing with tea tree oil to calm blemishes, lavender to relax and soothe or lemon to invigorate. Find out how by visiting **www.aromantic.co.uk**

Ecotip
Avoid talcum powder

This widely used white powder might look innocent, smell sweet and make you dry more quickly, but mining for soapstone, the chief ingredient in talcum powder, can be a dirty business. In 2003, the Environmental Investigation Agency (EIA) and Friends of the Earth found extensive damage to nature reserves in Rajasthan, India, caused by illegal and unsustainable mining of soapstone was lowering the water table and devastating the habitat of the endangered Indian tiger (see **www.eia-international.org**). So dich the talc. Who needs it when a towel is all it takes to get you dry?

Finance

Ethical finance is about taking control so that your finances are not tied up in deals you wouldn't like – like trade with oppressive regimes or funding dirty coal plants, oil extraction and unsustainable logging operations. Ethical banks finance companies and projects that benefit people and the environment so your money is working for – not against – the world

Where's my money?

How banks work

A bank is more than just a safe place to keep your money. Banks profit by lending your money to someone else. You don't get to choose who they lend the money to, or what your money is used for.

Why Triodos is different

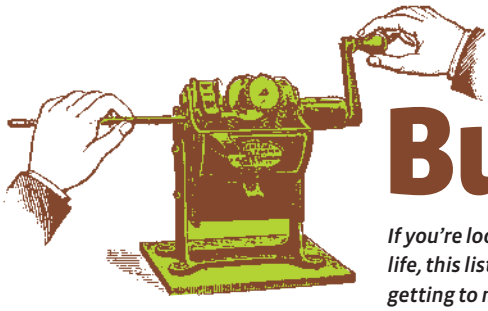
Triodos Bank is a different kind of bank. It doesn't simply refuse to put money into unethical enterprises; it actively seeks out and promotes sustainable, entrepreneurial businesses and organisations driven by values and ideas. It is behind one of the UK's best-known renewable energy companies, Ecotricity, as well as hundreds of organic and environmental initiatives.

A transparent approach

Triodos is also the only commercial bank to publish a list of every loan it makes and to provide that information to all of its savers – so as a saver you'll know exactly how your money is being used.

Some of the ethical businesses and charities that your savings could help to support:

- Ecotricity
- River Cottage
- Cafédirect
- Neal's Yard Remedies
- The Soil Association
- The New Economics Foundation
- Youth Hostel Association
- Greenpeace UK
- Fordhall Farm



Business services

If you're looking to green your company by changing suppliers, or just want to use more ethical services in your every day life, this list of business and service suppliers offers an eco solution. From alternative office supplies and ethical finance to getting to meetings, this range of companies demonstrates your business can be greener and greater than ever before

Ecotip

Cap your cartridge use

More than 30 million inkjet cartridges are thrown away annually in the UK. Save money and cut waste by refilling or remanufacturing yours. See **www.recyclethis.co.uk**

Ecotip

Stand by for switch-off

A computer left on overnight uses 1Kwh of electricity. 180 tonnes of Co_2 omissions could be saved if 1,000 people switched off.

Books and courses

Whether it's professional training you're after or a book that can teach you how, ideas that can change the world or practical skills to help with sustainable living, this is the place to find out about courses, books and websites that will equip you with more information on how to help people and planet

Ecotip

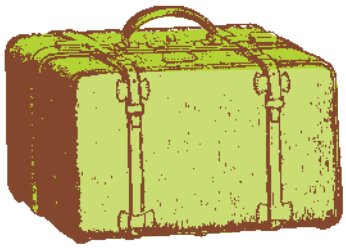
Make your own biodiesel

Biodiesel can be made from vegetable oil, animal oil or fats – so get friendly with your local take-away and recycle their used oil. See **www.biodiesel.org**

Ecotip

Give books a new lease of life

Already read a book you were bought? Give it to a charity shop – bestsellers in good condition help raise valuable funds – or hold a book-swap at home or work.



Holidays

There are plenty of ways to take a planet-friendly break and be an ethical traveller, from staying in a yurt in Devon to ecotourism holidays that benefit local communities and the environment. See below to find out about places in the UK and abroad where you can holiday with a green conscience

Ecotip

Happy camper

Get closer to nature and wake up on the edge of a beach or a mountaintop. Camping is a low-environmental impact, low-cost and fun activity at any age. If you've never been turned on to the survival instinct, it needn't be gruelling or uncomfortable. Borrow camping gear or buy it second-hand. You can pick up high-quality tents for very little by scouting around in your free ads or online. If you need a little more luxury there are many places that now offer yurts and tipis for hire.

Useful camping sites include:
www.preloved.co.uk
www.tents-for-sale.co.uk
www.ecofreak.co.uk
www.trellyn.co.uk

Home swap

Home-swapping has seen a rise in popularity as increasing numbers of people need frequent, affordable breaks from the stresses of 21st-century living. Check in advance and you could find yourself having an adventure in someone else's eco-home or swapping your semi for a houseboat. Visit **www.homelink.org.uk**

Conferences

Making a meal of our food

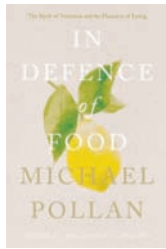
Do we trust science to provide our nutrition, rather than what's on the end of our forks? **Laura Sevier** digests a book that explains why no good can come of laboratory fodder

'Most of what we're eating today is not food,' says American journalist and author Michael Pollan, in this follow-up to *The Omnivore's Dilemma*. Instead we are consuming 'edible foodlike substances', products of science rather than nature. From processed food pumped with extra salt or fat for flavour to so-called 'healthy' food, processed to lower fat or carbs, boost protein or fortify with vitamins, Pollan argues that our modern, western diet has left us 'fatter, sicker and more poorly nourished'. At the root of the problem is what he calls 'nutritionism,' an ideology that, in championing the nutrient over the food itself, has encouraged an overwhelming array of reformulated and differently supplemented food products to hit the market. He explores how nutritionism has damaged our diet and health, and ruined the pleasures of eating. Although he mainly uses US examples, it's a situation that applies to other parts of the world where the US way of eating has caught on.

Extensively researched, lucidly argued and frequently funny, this book reveals the absurdity of our elaborately engineered diets: Coca Cola fortified with vitamins and antioxidants, or 'wholegrain white bread' containing corn syrup. Reading this book is enough to make you never trust a 'health' claim again, and have you run screaming for the nearest potato or pear – real foods that haven't been meddled with by scientists.

The final section elaborates on Pollan's solution: 'Eat food. Not too much. Mainly plants'. Guidelines include avoiding food with ingredients that are unpronounceable, unfamiliar or more than five in number – useful to remember when reading labels. Others, such as buying organic, locally sourced and seasonal produce, won't come as anything new to *Ecologist* readers. Above all, *In Defence of Food* is a call to action to 'vote with our forks' and bring real food back on to the national menu, as well as our own.

As Pollan notes: 'Eaters have real choices now, and these choices have real consequences, for our health and the health of the land and the health of our food culture – all of which are inextricably linked.'



In Defence of Real Food: The Myth of Nutrition and the Pleasures of Eating
Michael Pollan
£16.99 (Penguin, 2008)

The Rough Guide to Climate Change

Robert Henson (2nd edition, Rough Guides)

Why do we need another book on climate change? Well, when it is as concise, lucid and well-researched as this we have no reason to discount it. It's a fast-moving field, and this updated version covers the dramatic melting of the Arctic sea ice, highlights from the 2007 IPCC reports and an updated politics section to reflect post-Kyoto developments.

The book is broken down into sections that cover the basics, the underlying science, the controversy and debates, as well as possible solutions. It follows the *Rough Guide* format: accessible and informative. The research is thorough, right down to the history of climate change theory and the stance of Christian fundamentalists. Data is presented in detailed but easy to understand graphs and charts.

There are points where Henson could be accused of being 'overly balanced' when it comes to climate sceptics – his profile on Bjørn Lomborg and discussion of carbon-offsetting are good examples of this. He does address detractors' claims, however, giving the reader confidence to trust the science presented.

The Rough Guide to Climate Change is just that – a guide. Its objectivity prevents any strong conclusions, but this is one of the book's strengths. It is a positive step away from the hype and hysteria often used to address the issue. **Russell Scott**

A very current crisis

All life came from the oceans but we are turning them into watery graves. **Mark Anslow** on a fast-sinking resource

I wasn't looking forward to reading *Water: Life In Every Drop*. Its title has the ring of something from a biology textbook, and its cover image looked like a promotional shot from a Thames Water brochure.

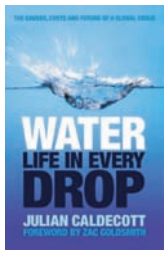
Happily, I was wrong. Caldecott keeps a masterly hand on the reins of what is a vast topic, dividing it up well and using the concept and properties of water to explore ecological issues on an impressive scale.

He begins with a fascinating examination of water as a molecule, familiar to every schoolchild as H_2O, but remarkable to scientists because of its ability to attract and interact with myriad other molecules. It is this peculiar chemistry, Caldecott explains, that gave rise to and sustains life itself.

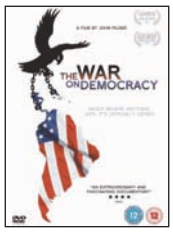
With laudable dexterity, Caledcott moves from the very small to the very large, from the interactions of atomic particles to the role water plays in the biosphere. He examines our interaction with water – oscillating as it does between worship and downright abuse. He dives into the depths of the oceans to remind us of the effect we are having on ecosystems that not only feed us, but also supply us with 160 square kilometres of potential rainfall every day. He weighs up the value of much-maligned wetlands and evaluates our relationship with the world's lakes – alternately water source, sewage dump and electricity generator. He also opens the reader's eyes to the world's the vast reserves of groundwater, which, once pillaged, may never be replenished.

But despite the retinue of shiver-inducing statistics he keeps at his fingertips, Caldecott is at pains to be optimistic. He relates some remarkable success stories, including a clam-restoration project on a decimated reef in the Philippines, which has had a phoenix-like effect on fish-stocks, and a mangrove-planting project in Indonesia to undo the damage caused by prawn-farming.

He takes a swipe at policy-makers offering up ideas for tax schemes and treaties to protect our aquatic resources. He ends with a call for us to be as conscious of the water in our products and lives as we are becoming of energy, asking his readers to set an example.



Water: Life in Every Drop
Julian Caldecott
£12.99 (Virgin, 2007)



DVD

The War on Democracy John Pilger

Journalist and film-maker John Pilger maintains a dignified outrage as he documents the role of the US in overthrowing democratic governments throughout Central and South America. The shadow of the 'Empire' is linked with Pinochet's Chile, genocidal campaigns in Guatemala, Nicaragua and El Salvador, and most recently the attempted coup against Venezuela's president Hugo Chavez. Interviews with Chavez, ex-CIA men, the wealthy and the poor paint a history of a continent's people crushed by violence and corruption.

Revolution is in the air however. In Venezuela, the people marched on the palace to demand the return of their leader. In Bolivia, the first indigenous leader has been elected on the back of popular uprisings against corporations stripping the nation of its gas and water assets. 'There is nothing as powerful as an idea whose time has come,' quotes Chavez, and with Brazil also taking back power from their northern cousin, Pilger ends this documentary on an upbeat note, suggesting that a change is sweeping the continent. **Nick Wilsdon**

Last words? Archi

Status: Extremely endangered – fewer than 1,200 speakers remaining.
Habitat: The remote mountain villages of Archi in the Caucasus, Daghestan, southern Russia.
Description: Archi is one of the most extraordinary of the world's languages. Its morphology (internal structure) is so complex that through different tenses, cases and associations, a single verb may have up to an estimated 1.5 million forms! This is further complicated by many verbs being irregular. To a speaker of a language as basic and comparatively free of nuance as English, such lexical dexterity is baffling. Intuition and lively communicative minds must play a large part in the speaking of Archi.

It also has a unique consonant, in the form of a voiceless velar lateral fricative. It comes from the front of the mouth. The International Phonetic Alphabet doesn't even have a symbol to cover this sound. They also occasionally use clicking made by the side of the tongue. Scholars have argued about which linguistic family Archi belongs to, but that it is one of the Lezgian-Samur group of Daghestanian languages is the most accepted view. It has spent a long time isolated from its relatives, however, explaining the evolution of its various peculiar features.

The range of sounds makes it hard to transliterate Archi and write it in our familiar Roman letters. Try 'Ð'uk'últ'an' (beetroot), 'q'alk'aÐ' (ragamuffin), 'šúšqusbos' (whisper – nicely onomatopoeic) and 'kálam' (cabbage).

A natural frontier between Asia and Europe, the Caucasus has been a cradle for many indigenous languages. In their 2,000m-high home, the Archi people have a strong sense of community, gathering together each winter. Let's hope this elaborate tongue manages to 'q'éjq'is' (remain), clinging on in the place of its 'nasháb' (origin).
David Hawkins

How to be free
The last untapped resource

The only way to avoid environmental catastrophe, says **Tom Hodgkinson**, is to put an end to wealth, not poverty

Sometimes it's good to take a peep at what the enemy is up to. I spent last weekend reading the *New York Herald Tribune*, and I'll sometimes look at *The Economist*. Both these publications are excellent in their way – the *Tribune* is far superior in writing and information to *The Times*, for example – but essentially feed the greed of a business-minded readership anxious to figure out what is going on in the world, the better to profit from it. They present a fantasy world full of abstractions such as 'jobs', 'shareholder value', 'growth' and so on. Recently, of course, the business mags and papers have been full of stories of failing banks and the global squeeze on credit. The papers also have started to express doubts, on America's behalf, about the US's faith in the philosophy of free markets. The sub-prime fiasco was an example of free markets – for which concept, read 'unrestrained greed' – gone wrong. Maybe, they say, we need more regulations on trade, as existed, for example, in the economy of mediaeval Europe.

These financial papers are also full of juicy facts. There was the poor chairman of Novartis, who had taken a cut of 20 per cent in his take-home pay following poor results. The poor guy only got $15 million last year. Let's hope his fortunes look up.

But perhaps the most fascinating piece was an interview with Jeroen van de Veer, CEO of Shell. Van de Veer says there is plenty more oil in the earth, but the problem is going to be getting it out as it's in hard-to-reach places. He also says demand for oil and energy in general will rise and rise over the coming years as the world population continues to rocket.

But what really struck me was his comment about poverty. Van de Veer predicts more people will be lifted out of poverty in the future, and points out that being lifted out of poverty means using a lot more energy and a lot more oil. The first thing you do with a little money is start to consume oil. You also buy more stuff, more plastics and more of the output of the industrial society.

Just think about that. The gradual elimination of poverty would mean that global demand for oil would rise, when readers of this magazine are hoping that it will fall. This means, in effect, that wealth is ecologically damaging. It is not eco-friendly. And it means poverty is eco-friendly. Subsistence farmers of the East will consume a fraction of the oil of your typical family in Europe or the US.

'These companies are not as concerned with ending suffering as they are with ending people not having the money to buy their products'

I'd often wondered why über-capitalists are so up for ending poverty. I didn't think they would care much about poor people. And then I realised: it's because less poverty means more new markets for their stuff. It means more money for them. These companies are not as concerned with ending suffering as they are with ending people not having the money to buy their products, including oil. This is what is behind absurd ideas like laptops to Africa: with its stream of advertising, the laptop would open up new markets for global concerns by convincing Africans that they need IKEA furniture or Coca-Cola or Nurofen.

So when we talk glibly about our desire to end poverty, we need to reflect a little more carefully on what that means. In actual fact, one way to avoid environmental catastrophe would not be to end poverty but to end wealth. It is wealth, not poverty, that makes the problems. A self-sufficient subsistence life may look to us like poverty, but if people have all they need and enjoy life, what is wrong with being poor?

This is why I would recommend that every family and individual try to earn and spend less money, not more. Use your imagination to live well on less each year. This way you will consume less and so create less pressure on the world's resources. Ending global wealth may be the only way out of our predicaments. And after all, what else are the promoters or thrift and sustainable living really saying, but 'be more poor'?

The chairman of Novartis is doing less than most for the environment simply by earning such megabucks. And we could perhaps take a tip from the former chairman of Shell, Lord Oxburgh, who is forcing poverty on his family by making them bicycle to the shops rather than take the car. E

Tom Hodgkinson is the Editor of *The Idler* and author of the book *How to be Free* (Hamish Hamilton, £14.99).

Illustration DAVID HUMPHRIES

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We're passionate about ethical living so we've made our website a better place to visit.

Shop for fashion, accessories, jewellery, home and beauty for your whole family. Or perhaps you'd rather just learn more about ethical fashion and take ideas from our brand new style guides?

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ADILI.com

JUST ETHICAL BRANDS

Spoil your loved ones,

not the planet.

You'll be smitten by the thousands of ethical gifts we've got on offer. From fairtrade chocolate to organic cotton underwear, all of our products are lovingly made and ethically sourced. Buy online at www.ethicalsuperstore.com and we'll even deliver for free. This year, show cupid you care for the environment as well as your loved ones.

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