Viva!

DIET OF DISASTER

by Tony Wardle

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"Ultimately, if left unchecked, environmental degradation may threaten not only economic growth and stability but the very survival of humans on the planet." United Nations Food and Agriculture Organisation, November 2006

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OVERVIEW

When it was founded in 1994, Viva! started campaigning on the environment, warning that livestock farming is destroying the Earth. Pick any of the most threatening environmental problems, we said, and you will find farmed animals at the heart of it.

It was not that we were clairvoyant but that there was a mountain of science available even then to show that the animals used to produce meat, dairy and leather were responsible for a devastating loss of forests, the unrelenting spread of existing deserts and the degradation of fertile land into lifeless dust.

The facts were clear – farmed animals are also largely responsible for the overuse of fresh water, for the pollution of surface, ground and sea water, for the devastating loss of species and for the bulk of acid rain. Livestock are also major players in the most pressing of all catastrophes – climate change. The concerns which started our campaign have grown much more acute as meat, fish and dairy consumption across the world has increased.

Much of this evidence was explored in popular but fully-referenced books such as *Diet for a New America, Food for a Future, Beyond Beef* and Juliet Gellatley's (Viva!'s Director) *The Silent Ark* so it wasn't buried in obscure archives but readily available to all. Governments and their battery of advisers chose to ignore this research almost in its entirety and the outcome is a global crisis that threatens us all.

The reason why livestock are so damaging to the global environment is their gross inefficiency in converting plant foods into meat. The most inefficient of all are cattle who, for every 17 kilograms of high-quality vegetable protein they eat, produce just one kilogram of meat. The other 16 kilograms is required to maintain their temperature, provide them with energy and fuel their bodily functions or is simply excreted. To a lesser degree it is the same with all other farmed animals.

In a world which has essentially run out of new sources of agricultural land, it is insane that 70 per cent of all farmed land on the globe is dedicated to rearing animals in an orgy of cruelty and inefficiency that truly boggles the mind. On a vegetarian diet less than half the current agricultural land would be needed – on a vegan diet less than a quarter.

The current level of meat and dairy consumption as it stands – 55 billion farmed animals were slaughtered

worldwide in 2006 – is utterly unsustainable and is destroying the global environment at a scale never previously seen. And yet the two industries are boasting of their plans for future growth. This can only happen by greater intensification into obscene factory farms, more use of chemicals and a destruction of remaining forests and wilderness areas.

If this happens there is no doubt about the outcome – all the devastating problems highlighted in this report will accelerate, including global warming. The more enlightened in the meat industry are aware of the dangers that will result. "…Nature might be totally unpredictable if knocked out of balance – we are not able to destroy the Earth but we might change the climate in an unpredictable direction, at worst endangering our survival as a species." That was Europe meat industry vets writing in 1990 – many more authoritative voices have since echoed their sentiments.

In 2006, the United Nations Food & Agriculture Organisation (UN FAO) produced an extraordinary report on the devastating effect that animal agriculture is having on the planet (*Livestocks' Long Shadow – environmental issues and options*). Running to almost 400 pages with 666 references, it is an extraordinary document and establishes that livestock are one of the greatest threats to the global environment. The quote on the cover of this report illustrates just how seriously the UN FAO regards the situation.

The detail of their report is extraordinary and it serves no purpose to repeat it all here. It would, however, make a superb adjunct to this report, which draws on research from other sources and attempts to interpret some of the UN's findings. (View at www.fao.org/newsroom/en/news/2006/1000448/index.html)

The same politicians who have historically ignored the environmental impact of livestock by blinding themselves to the science appear to be eager to repeat the process, failing to acknowledge the importance or even existence of the UN FAO's report. Instead, they flit around the margins of this crisis pretending they have the answers when they have not even identified the problem.

It is a global calamity and the increasingly desperate wording in scientific reports reflects this but the meat and dairy industries, as far as politicians and the media are concerned, are apparently beyond reproach. Just what a betrayal of the democratic process this amounts to is made clear by my report.

The tragedy is that livestock are at the heart of all the world's great environmental catastrophes and currently there appears to be no attempt to rein in the unbridled expansion of the global meat and dairy industry. In fact the opposite is true – it is expanding almost exponentially with massive subsidies to encourage its growth.

Current obsessions – and rightly so – are with climate change but this has obscured many other environmental disasters that may in the long term create equally devastating problems for life on Earth.

It is now clear that livestock and industrial fishing are the second biggest source of greenhouse gases from a combination of carbon dioxide produced by meat, dairy and fish production methods, methane from ruminants' digestion and nitrous oxide from manure. This combination accounts for 18 per cent of global warming compared with 13.5 per cent for the world's entire transport system – cars, boats, planes, trains, lorries and so on.

Interestingly, air transport accounts for three per cent of global warming gases yet this is the industry the UK government has chosen to pillory as the unacceptable face of capitalism. It has ignored entirely the role of livestock despite concerns that we are close to – or may have already passed – a point of no return where the world's complex ecosystems take over and trigger a process known as positive feedback. This is when the globe automatically begins to release its vast deposits of methane and carbon and the phenomenon of global warming becomes unstoppable and uncontrollable.

No one knows what the long-term effects will be of trashing the planet's biodiversity – exterminating plants, animals and micro-organisms – in an orgy of vandalism for short-term profit. One thing is certain, it will not be to the benefit of humankind.

Livestock producers are the driving force behind loss of biodiversity and they can already claim to have driven to the brink of extinction one-third of all amphibians, a fifth of mammals and one-eighth of all birds. This is based on known species and yet it is estimated that 90 per cent of all existing species are unknown and so the true rate of extinction could be 10 times greater than this.

At the heart of this appalling decline is the trashing of rainforest across the globe by ranchers fuelling the burger boom with cheap beef. Everyone who eats meat or dairy can also claim a stake in the destruction as soya animal feed increasingly becomes the high-protein fodder of choice.

Some 70 per cent of cleared Amazon rainforest is used for grazing cattle while most of the remaining 30 per cent is used for soya production for animal feed and Europe is one of its most eager importers.

The trampling of heavy bodies and hard hooves of livestock and their overgrazing are the primary reasons why deserts are remorselessly spreading everywhere, why topsoil is being lost far faster than it can be created, why land is degrading and soil is losing its fertility in almost every region of the world, including the US.

Arid and semi-arid lands girdle the world and make up one-third of the total land surface. Some 72 per cent are degraded, primarily by grazing animals.

In the quest for yet more animal protein, the devastation on land extends to the oceans where 82 per cent of species are being fished beyond safe biological limits – they are on the road to extinction. Fish farming – aquaculture – is increasingly being touted as the answer to overfishing. Not only is it not the solution it is a central part of the problem. For every tonne of farmed fish produced, four tonnes of wild-caught fish are killed to provide their food. As the current output of farmed fish is around 40 million tonnes per year, that's an awful lot of killing.

In some ways it feels as though we have all been here before. Although not strictly an environmental concern, the other side of the same livestock coin is the impact that meat and dairy are having on human health in the affluent West. They are the primary cause of the affluent degenerative diseases which destroy the health of most people in the developed world, which place virtually the entire population at risk and which eventually kill most of them.

Cancer and heart disease are at epidemic proportions, afflicting one in three of the population and increasing remorselessly, as are both types of diabetes (1 and 2), strokes, obesity, Alzheimer's disease, osteoporosis and gall bladder disease, amongst others.

Despite official claims to the contrary, we are a seriously ailing population increasingly dependent upon pills, potions and procedures. It is early diagnosis and these interventions which are the primary reasons for increases in longevity. We're living longer but not healthier and again it is meat and dairy which carry the lion's share of the blame.

The science implicating animal products in the West's health crisis is overwhelming and was brought together in a scientific review by the World Health Organisation (WHO) in 1990. It was unequivocal in its findings, with strong urgings that there should be a fundamental change in the West's agricultural polices – the marketing of meat and dairy products ended in favour of plant foods.

It also warned that its recommendations were likely to meet with fierce opposition. In this they were wrong – the report was simply ignored.

The WHO's main concerns were over saturated animal fats and cholesterol as well as added fats, salt and sugar. Reporting at the same time, however, was the landmark China Study, the largest epidemiological study ever undertaken. It established that animal protein was even more damaging to health than saturated fat and triggered cancers and raised cholesterol levels and that the damage began at very low intakes.

This was also ignored. In fact despite the profundity of these findings and the flood of other research which has followed, public health policy has barely been influenced at all. Worse than this, many health authorities, through their nutrition pyramids and recommended food group intakes, have continued advocating meat and dairy products as an essential part of the diet.

The official diet recommended to those with heart disease still includes white meat and dairy products and reduces the risk of a heart attack by only five per cent. A plant-based diet could take them out of the risk zone entirely and even reverse the damage to their arteries. It begs the question – why is meat so protected?

We cannot afford a similar bout of political protectionism for the livestock industries where the environment is concerned.

Added to these degenerative health threats are new, infectious ones, some of which have already revealed themselves whilst we await the arrival of others with trepidation.

In 1969, the Swann report raised serious concerns about the overuse of antibiotics in intensive (factory) farm systems for disease control and their administration on a daily basis as growth promoters. The fear was that because of bacteria's ability to develop resistance (and pass on that resistance to other bacteria species) in animals, when those bacteria infected humans they would carry their antibiotic resistance with them, resulting in a steadily decreasing choice of drugs with which to treat the infections.

Two similar but much more recent reports have said much the same thing but far more stridently, warning of an end to all invasive surgery. A return to pre-antibiotic days would have a profound impact on the population and herald the return of widespread infectious diseases.

While governments have tinkered around with this problem, banning some growth promoting or therapeutic antibiotics here and there, antibiotic use has continued unabated in factory farms – in fact they could not survive without them such is the nature of these cruel and appallingly unhygienic systems.

What Swann could never have predicted, of course, was the extraordinary increase in global meat and dairy consumption and the concentration of 80 per cent of livestock into crowded, intensive systems. There has been a corresponding explosion in the quantity of antibiotics used and the subsequent development of resistant strains of deadly food poisoning bacteria such as salmonella, campylobacter and E coli 0157.

Just as concerning is the mutation of superbugs such as MRSA, VRSA and *C Difficile*, which are killing increasing numbers of people through hospital-acquired infections. In his book, *Superbug – Nature's Revenge* (1995), Geoffrey Canon estimated that 60,000 people a year in the US were dying from infections they caught while in hospital.

At about that time I was researching the US health care system and was advised by a group of doctors not to be admitted to their hospitals if I could possibly avoid it. If I did have to go in, I should have as little done to me as possible and get out as soon as I could. Both these statements were shocking

back then but the situation has got a great deal worse since and now applies equally to the NHS.

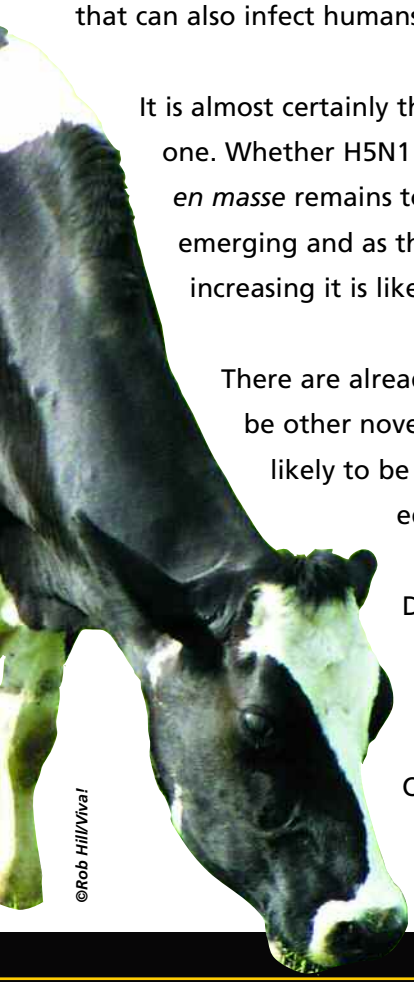
Part of the problem is due to the overprescribing of antibiotics by doctors and their availability off the shelf in some third world countries, but livestock producers consume 50 per cent of all antibiotics and the way they are used makes them even more culpable than prescription drugs.

Superbugs have arrived and they are not going to go away – they are widespread in the environment and are even present in the intestines of many of our children. As antibiotic-resistant bugs have the ability to pass resistance on to other, unrelated bacteria, this worrying problem will continue to develop in unforeseen ways.

Livestock producers have poisoned the environment at every level, even a microbiological level and we have no idea how devastating the eventual outcome will be.

Just as they have started us down a road where infections are increasingly difficult to control because of antibiotics that no longer work, we are also presented with the spectre of new pandemic diseases to which we probably have little or no resistance. The current fear is over bird flu.

Each species of animal used in intensive farming is invariably drawn from the same genetic stock. Selectively bred for quick growth and rapid weight gain they tend not to have good disease resistance. The problem is exacerbated by overcrowding and bad hygiene which leads to permanent stress, reducing the effectiveness of their immune system even further. Any disease which gains a foothold in one animal is therefore likely to rip through them all. Each new mass infection increases the likelihood of a bacteria or virus mutating into a form that can also infect humans.



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It is almost certainly these conditions that turned a relatively benign bird flu virus – H5N1 – into a virulent one. Whether H5N1 bird flu will mutate again into a form that can infect humans and potentially kill us *en masse* remains to be seen. Whether it does or not, there will be other new bacteria and viruses emerging and as the mass of farmed animals goes on increasing and the use of antibiotics goes on increasing it is likely that so will the risk.

There are already new wasting diseases appearing specific to pigs and it is inevitable that there will be other novel diseases that infect humans also. We know what the government's reaction is likely to be from the manner in which it handled mad cow disease (BSE) and its human equivalent, vCJD.

Despite evidence to the contrary, it insisted that this new, incurable and highly-infectious disease would not infect humans, desperately placing the survival of the meat and dairy industries above human life.

Of course they were wrong and it is only luck that comparatively few people have developed and died from vCJD and it has not become a mass epidemic – so far.

A similar lack of concern for human life is revealed in the economic stranglehold which the developed nations have on the third world. Discriminatory import tariffs ensure that impoverished suppliers of cash crops remain that way. The crops they grow are largely high-protein fodder crops destined to feed the West's animals.

It is a huge industry largely controlled by multinational corporations (MNCs) and it is no coincidence that the countries which produce the bulk of these fodder crops are the most impoverished – those with crushing burdens of landlessness, food insecurity and starvation-related diseases.

Published in 1980, the Brandt report attempted to chart a path to greater equality and fairer trade between nations with an emphasis on global democracy. At that time, MNCs controlled one-third of world trade. Since then their share has increased to two-thirds, helped by the privatisation of third world economies on the insistence of organisations such as the World Bank and International Monetary Fund (IMF).

> dramatically reducing meat and dairy consumption is now a global necessity

The World Trade Organisation (WTO) was spawned by the same vested interests and whatever its claims at moderating world trade, it is part of the holy trinity of global trade control. All three organisations are essentially instruments of the MNCs – conceived by them and acting in their interest and, hardly surprising, it is they which prosper at the expense of the world's poor.

It is farmed animals, their feed and drugs, pesticides, fungicides, herbicides and fertilisers which are largely the engines of this exploitation.

Resources sold off by poor nations and largely bought by Western companies include energy, land and water – three elements vital to expansion of the livestock industry for both grazing and fodder production. The outcome has been even greater landlessness and food insecurity amongst the world's poorest people.

The violence which disfigures so many regions of the world is not unrelated to this destruction of the global environment and people's essential support networks. The West's addiction to animal protein carries much of the blame and directly contributes to starvation, disease, death and impoverishment of the world's already most impoverished people.

German ex-chancellor Willy Brant and his eminent team were obviously deeply moved by their research and warned that 'business as usual' was not an option for the West. Unless fundamental concepts of justice were introduced into relationships between the rich nations of the North and poor nations of the South, they said, we would witness conflict and bloodshed on an unprecedented scale.

It has been business as usual and the Brandt team's dire warnings appear to be coming true. A fundamental start to transforming this desperate situation would be the availability of land for the growing of crops for

local consumption. It cannot happen while so much land is devoted to farmed animals for the West and they continue to devour the Earth more voraciously than any plague of locusts.

I have included health and development issues in this environmental summary, along with antibiotic resistant superbugs and novel diseases, because they have a common cause; maybe not the only cause but certainly a major one – livestock.

In human and environmental terms, all these disparate effects of livestock farming are profound. However, they are so interlinked that an improvement or reduction of risk in one area will have a powerful knock-on effect in all the other areas.

Reduce livestock farming to save the global environment and fewer animals will suffer, less meat and dairy will be eaten and there will be a reduction in degenerative diseases, a drop in the use of chemicals, pesticides and fertilisers, a lower consumption of drugs and antibiotics, with a subsequent reduced risk of dangerous superbug mutations and novel diseases and a chance for the world's most impoverished people to gain the fundamentals of life.

This is such an extraordinarily powerful argument that it beggars belief that it is still having to be fought for.

Dramatically reducing meat and dairy consumption is now a global necessity.

So why was the Brandt report ignored and the Swann report and the WHO report and the China Study…? And what are the prospects of this latest extraordinary report from the UN FAO being acted on? Very few, it would seem.

Not an obvious person to quote but Sir Winston Churchill did have a way with words and this observation is apposite: "Men occasionally stumble over the truth, but most of them pick themselves up and hurry off as if nothing ever happened". Even the UN FAO appears to be guilty of just this.

Having spent the greater part of 400 pages outlining in extraordinary detail how farmed animals are destroying the Earth and backing up their claims with hundreds of references, the FAO then attempts to offer solutions which are patently unachievable and at no point say 'reduce your meat consumption' or 'go vegetarian or preferably vegan'.

Such advice would empower people, enabling them to take the solution into their own hands and make personal decisions which would instantly impact on a globe in crisis. Simply by saying 'Not for me and not in my name' they could slash not just their carbon footprint but all the other footprints which livestock producers have ensured are now indelibly trampled across almost every square meter of the Earth's surface, below the surface, in the air and in the water. And all they have to do is change their diet!

Instead of encouraging this most simple and effective of remedies, the UN FAO pretends that the consumption of livestock products, already causing global devastation and patently unsustainable, can continue simply by producers reducing the environmental impact made by each animal – slashing it by half. How they will do this is through 'correcting for environmental externalities,' 'accelerating technological change,' 'reorientating extensive grazing towards provision of environmental services,' and 'encouraging efficiency through adequate market prices'.

About the only recommendation that is comprehensible out of this and much more bureaucratic speak is that the market forces will provide part of the answer – the very forces that created the problem.

The solutions it offers do not stand up to even cursory investigation as sensible answers to its central concerns, which are:

> *"The livestock sector emerges as one of the top two or three most significant contributors to the most serious environmental problems, at every scale from local to global."*

> *"Livestock's contribution to environmental problems is on a massive scale…. The impact is so significant that it needs to be addressed with urgency."*

> *"The findings of this report suggest that it should be a major policy focus when dealing with problems of land degradation, climate change, and air pollution, water shortage and water pollution and loss of biodiversity."*

Is the refusal to recommend the most simple, logical and easily achieved solution to these profound problems simply cowardice or an inevitable result of the report being co-ordinated by the Animal Production and Health Division of the FAO? It is fundamentally an organisation that represents the interests of the livestock sector and it seems there are limits on how hard it is prepared to bite the hand that feeds it.

livestock's contribution to environmental problems is on a massive scale

It says that to accommodate future growth in livestock production "we need to halve the impacts per unit of output to achieve a mere status quo," a status quo that is devastating the planet! It does not say that we need

to halve meat and dairy consumption but places the emphasis on a solution which is impossible to achieve. It is an abrogation of responsibility on a massive scale.

Perhaps it is for this reason that it defines its role as finding "suitable technical solutions" but concedes that the ultimate decisions to address the damage done by livestock will be taken outside the agriculture sector. By this we presume it means government. If that is the case then we can anticipate procrastination, confusion, lack of action and a complete absence of joined-up thinking whoever is in power.

Our political parties all profess to care about the environment but this does not translate into effective policy making. At the time of writing this report (November 2007) we have just come out of a phoney pre-election period in which each party slapped its environmental credentials on the table, boasting about whose was the biggest. So we know what they have in store.

The Liberal Democrats declared their intention to research fodder that would reduce the emission of methane from ruminants. By how much they don't know, but if it works at all it is likely to be marginal and will do nothing for the majority of ruminants across the globe that graze on rough land. It would, of course, also do nothing to reduce the impact of non-ruminant animals such as pigs and poultry or cut the nitrous oxides from excreta or CO_2 from farm machinery or reduce livestock's contribution to all the other global problems.

The Conservatives chose to single out aircraft, taxing them to ensure they don't fly with empty seats. The costs of fuel and airport charges already make flying with empty seats uneconomic and an additional tax is unlikely to offer any additional incentive.

Their environmental adviser, Zac Goldsmith, ex-editor of the *Ecologist*, has his own and rather strange view on livestock production. As a non-executive director of the Weston A Price Foundation, he gives support to their position that we all need to eat meat and animal fat in quantity and that full fat dairy milk is a cure for many diseases.

This, of course, stands a mountain of scientific research on its head and offers little hope that the Tories will produce sensible policies to tackle this global crisis.

His first (short lived) suggestion was a tax on supermarket car parking so people would pay for driving there and contributing to CO_2 emissions. They could, of course, then buy meat and dairy, which produces many times more greenhouse gases than cars, without any tax deterrent.

Labour has also singled out aircraft as the unacceptable face of capitalism and proposes taxing them. At the same time it continues encouraging people to eat meat and dairy by paying out generous subsidies to farmers of around £3 billion annually, the lion's share being for livestock and fodder production. This ensures that prices remain artificially low and helps to increase sales.

Dairy farmers receive in the region of £80 million in subsidies while the Milk Development Council is joined at the hip to government, being sited within Defra, and is funded from public money with a remit to encourage

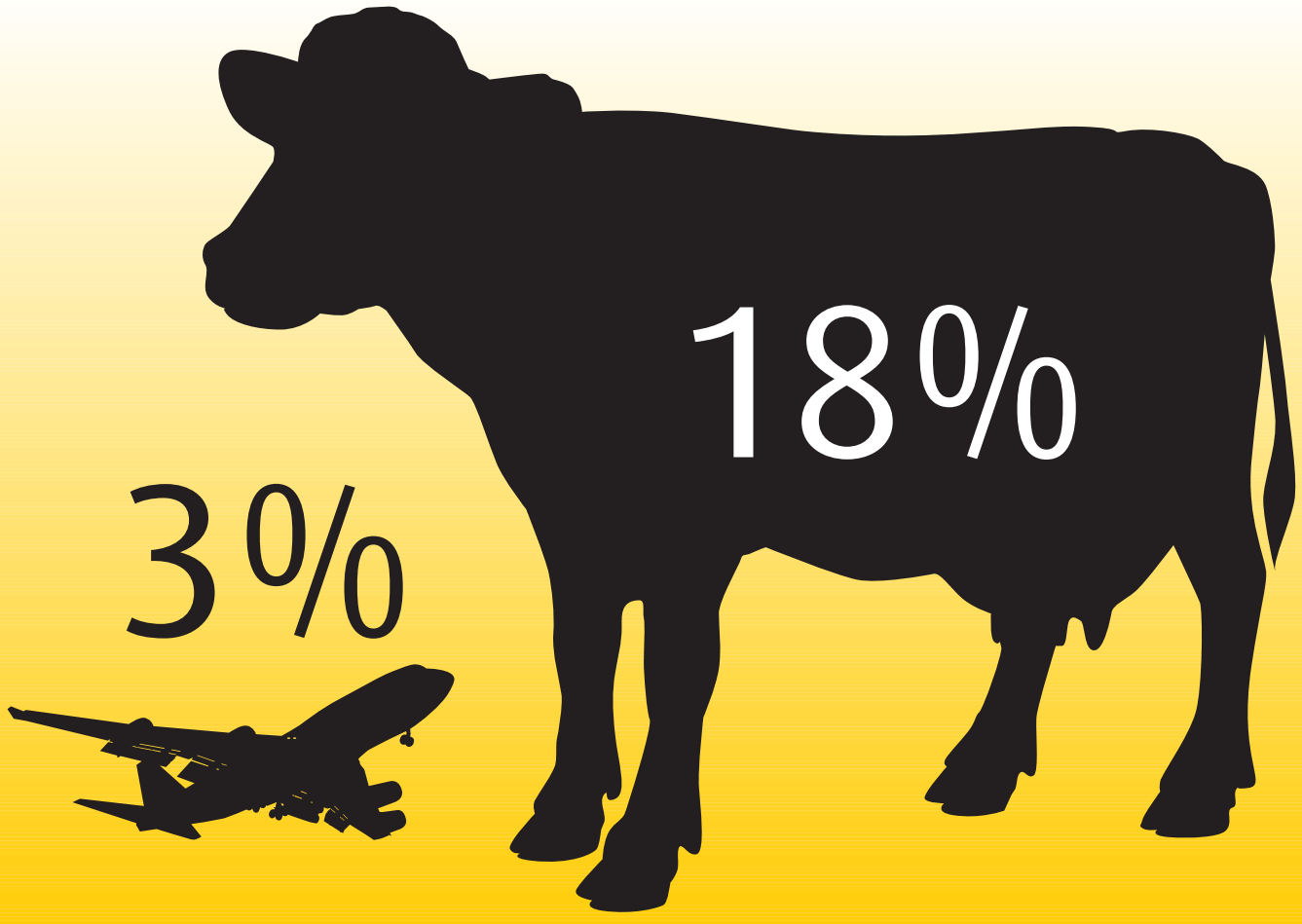
milk drinking. The government also promotes the EU Butter for Manufacture Scheme, encouraging food manufacturers to use butter fat in their products in place of vegetable oil. And of course, it encourages and subsidises milk drinking in schools.

Aircraft produce around three per cent of greenhouse gases, livestock 18 per cent, plus contributing to a raft of other problems. This is an extraordinary use of public money by any standard – encouraging the consumption of products which are at the heart of the nation's health crisis and the world's environmental crisis. It is unlikely to change whoever is in power in the foreseeable future.

One of the most depressing aspects of livestock's impact on the globe is the refusal (so far) of the large campaigning environmental organisations to take this on board. Both the *Ecologist* magazine and Friends of the Earth have encouraged meat and dairy consumption with cookery articles. Greenpeace has come the closest to calling for a move towards a plant-based diet but still fails to commit itself.

The assumption is that so long as meat and dairy are free range and organic they tread lightly on the Earth and do no damage. These systems are certainly better for the animals involved but not necessarily for the environment.

In fact, part of the FAO's rather ludicrous solution is to encourage (half heartedly) further intensification of livestock farming as being less environmentally damaging than free range.



Equally as inexplicable are the policy decisions of the large animal charities. The RSPB pleads for more agricultural land to be left untouched and available for birds to end the rapid decline of some species but never advocates cutting meat consumption and never criticises livestock, which demand 70 per cent of all agricultural land.

A plant-based diet would require less than a quarter of the present agricultural land, allowing Britain's wild areas to regenerate and the birds and animals that have long since been destroyed (as well as those in decline) to return. The new growth of shrubs and trees on such a large scale would constitute a massive carbon sink.

a plant-based diet would require less than a quarter of the present agricultural land

The RSPCA was set up to safeguard the interests of domestic and wild animals and in 1994 formed its wholly-owned subsidiary, Freedom Food, a so-called meat and dairy assurance scheme. The RSPCA Freedom Food logo appears on both free range and factory farmed meat and its point-of-sale displays extol the virtues of its products, actively encouraging meat eating.

These same animals are central to the destruction of ecosystems globally and are the single biggest cause of species loss. Through its promotion of meat and dairy, wild animals across the world are being decimated and pushed towards extinction, as are the ecosystems which support them. It is quite literally inexplicable for an organisation set up to protect them.

The RSPCA would no doubt argue that it is pushing a particular brand of meat and not meat *per se*. This was an argument used by the tobacco lobby to retain cigarette advertising – and comprehensively dismissed. By associating itself with meat and dairy products the message it promotes is that everything is fine and there is no need to worry about eating meat and dairy.

Everything is not fine and there is plenty to worry about.

The simple truth is that the effects livestock are having on the planet dwarf in importance all the other campaigns of these groups combined. It cannot be an accident that they have avoided this most important of environmental subjects. Could it be that their refusal either to actively encourage a reduction in meat and dairy consumption or to promote a vegan diet is because it will be unpopular with members and might affect income?

Whatever the reasons, it confirms yet again the privileged position that meat and dairy have been granted in our society and difficulties groups such as Viva! face in trying to raise awareness of the damage they do. In the many TV and radio debates we have had with the farming industry there has been no acknowledgement of the problems let alone agreement on how to deal with them.

The whole approach begins to feel like an episode from the TV comedy series *Fawlty Towers*, entitled: "Don't mention the meat!"

Unless this changes rapidly, the future looks exceedingly grim. There are barely any politicians who have exhibited the kind of political courage that will be necessary to tackle meat and dairy consumption as the threat they pose to society.

One inescapable fact from the FAO report is that we have essentially run out of land for livestock production and yet it is forecast to go on increasing – dramatically. The land to accommodate this growth will be from the further clearing of yet more ecosystems such as rainforests or by increasing yields through greater intensification of existing production with massive chemical inputs. The result of either will be disastrous.

Yet at the same time, governments worldwide are encouraging the development of biofuels as alternative sources of energy – wheat, palm oil, willow and so on. Without curbing livestock production this is clearly unsustainable because there is simply not sufficient land for both. Sadly, the felling of Indonesian forests to provide palm oil plantations is a clear indication of the direction in which we're heading.

Further intensification of arable farming will accelerate the relentless degradation of land, resulting in loss of soil fertility and the release of CO_2 it holds captive, spurring more global warming. It will also reduce the planet's ability to absorb CO_2 in the future. The same is true for rainforest clearance – producing large amounts of CO_2 from slash and burn and reducing the amount of new growth, which absorbs CO_2.

There is no longer any serious scientific argument that sea levels won't rise as global warming continues. The only question remaining is by how much. The humanitarian catastrophe this will create will be matched by widespread conflict as millions of displaced people move on to other's land and the total of land available to support life is reduced.

There are no policies by any of the leading political parties to address these profoundly disturbing events and it is clear who will have first call on the land remaining.

we have essentially run out of land for livestock production

The huge, multinational pharmaceutical corporations are courted and feted and we are increasingly warned that if animal welfare organisations insist on exposing their maltreatment of animals or demanding higher standards, these giants will relocate abroad. Their existence is presented as essential to our survival when they are major contributors to our potential destruction.

The fact is, they have been instrumental in turning the health service into a sickness service based on prescribing a pill for every ailment. Only two per cent of the health budget is spent on prevention – for major killer diseases which are largely diet and lifestyle related and therefore eminently preventable.

The government's reaction to the introduction of their genetically modified organisms (GMOs) typifies the privileged position the pharmaceutical giants hold. It was gung ho about them and even appointed a proponent of GMOs in the form of Lord Sainsbury as Science Minister. His role was clearly to usher in these unknown new life forms and it was only the reaction of the public which stopped it.

The determination to introduce them continues unabated but more stealthily. The billions spent on research WILL be repaid. Many people have objected but few have, in my view, identified the real reason for GMOs. The answer is inextricably linked to livestock production and has nothing to do with feeding the world's impoverished – in fact their widespread use will ensure a rapid growth in the number of impoverished people.

The concentration of 80 per cent of the world's livestock into intensive factory farms has proved a bonanza for the $600 billion pharmaceutical industry, which has encouraged and welcomed it and grown rich on the results. Some 55 billion animals are slaughtered annually at the moment (but increasing) and this burgeoning animal population has to be fed, mostly with the products of intensive agriculture.

Land is pushed beyond its natural ability with artificial fertilisers and a battery of pesticides, fungicides and herbicides – products of the pharmaceutical industry! The animals themselves cannot survive without a similar onslaught of medications, antibiotics and pesticides. And when humans eat the resulting animal products they develop the degenerative diseases that pharmaceutical companies pretend to control with a dazzling selection of medications. A pill for every ill! It is a wonderfully brilliant circular scam that eclipses pyramid selling in its ingenuity.

In order to maintain their phenomenal growth rate it is essential that this industry spreads intensive farming across the world. It is their goose which lays golden eggs. The theory is that herbicide-resistant GMO's will enable them to eliminate all other plant forms from agricultural land and squeeze every last drop of production from it. Another chapter in the unfolding environmental nightmare.

Without increased fodder supplies there are limits on how far and fast factory farming can spread and a subsequent limit of the pharmaceutical companies' profitability. They also need land and water and it is no accident that the policy of privatisation for developing countries promoted by the IMF and World Bank is increasingly placing both in their hands.

It is also no accident that the first major GMO crops introduced are essentially fodder crops – maize, wheat,

soya, rape seed. And as global food output reduces, as is already happening with wheat, it will be diseased and dejected but profitable caged animals who take precedence and the very unprofitable, impoverished people who will go without.

Any doubts about this cynicism should be dispelled by the action of some pharmaceutical companies towards South Africa's attempt to supply cheap generic drugs to its AIDS patients. They were fought all the way by the patent holders despite having one of the worst AIDS problems in the world, an epidemic which is devastating the country and causing unbelievable suffering. Even with the spotlight on them, the companies initially chose profitability over compassion.

They have flooded the wealthy Western markets with a dazzling array of medications to treat every real and imagined ailment but have almost entirely ignored the devastating diseases that ravage populations in the third world. There is no profit in poverty – and so it will be in the scramble to control diminishing food supplies. Feed for animals will increasingly take precedence over food for people.

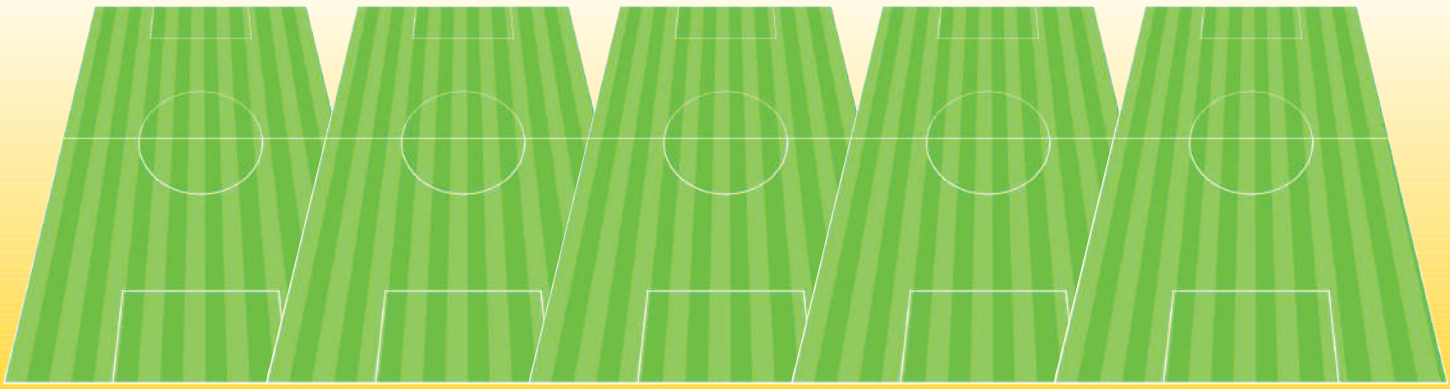
Again meat is publicly let off the hook and Lenny Henry in his sparkly suit, development agencies and other wearers of red noses make no reference to it. Don't mention the meat!

The scale of environmental decline is profound yet politicians have reduced it to ludicrous sound bites that pretend to offer action but are meaningless. 'Polluter pays' is a classic example.

This implies that there are two groups of people in Britain – those who pollute and those who don't. Presumably, those who drive four trax and fly frequently are the polluters whilst the rest of us are non polluters.

We are all polluters on a massive scale but none more so than those who regard meat, fish and dairy products as central to their diet.

However, these products are, in many ways, no different to all the other products which result from a free



An area of land the size of five football pitches (10 hectares) will grow enough meat to feed two people, or maize to feed 10; or grain to feed 24; or soya to feed 61.

market and to attempt to curb their use would provoke howls of protest from very powerful vested interests.

The fact that they are being consumed at an unsustainable rate takes second place to maintaining the concept of a free market, just as it does with oil and dozens of other minerals and metals – and even water. This is the dilemma which confronts almost every government in the world and which they are impotent to answer.

It is a problem exposed by the UN Environment Programme which maintains that to continue consuming at the present rate we will need two additional planets to exploit. The mathematics are blindingly simple – we cannot continue with a policy of constant growth, consuming the worlds resources at an ever-increasing rate, when those resources are finite and the process of consuming them has the potential to destroy us!

> the policy decisions that are so vitally needed may be a long, long way off

Growth is the bed rock of consumerism and to end it arbitrarily will result in a global economic collapse, not to end it will result in a global ecological and environmental collapse. The former can be managed by acknowledging the dilemma quickly and planning for it by dramatically reducing our impact on the globe – essentially transforming the way society functions and ending constant growth as its driving force.

The latter is likely to wipe us out as a species and many other species along with us.

Look around the globe and the portents are not good. Rather than planning for the inevitable there is a desperate attempt to prolong the reckoning as long as possible through 'me-first' foreign polices.

There is a scramble for the remaining resources, with so-called democratic Western governments pursuing imperialist wars for oil in Iraq and Afghanistan – the gateway to several, oil-rich smaller countries. We stand idly by as people are cleared from Darfur to make oil exploration trouble free. We are courting some of the most odious regimes across the Middle East and in Uzbekistan and Burma and blinding ourselves to their appalling human rights record – in return for oil and gas. Battle lines for conflicts over ground water, rivers and minerals are already being drawn.

One country which illustrates the confusion and hypocrisy better than any other is China. The West has virtually subcontracted much of its manufacturing base to this authoritarian regime and eagerly accepts the mountains of plastic and cheap products that it produces. At the same time, we wring our hands over its environmental record and shake our heads in despair at the pollution they are creating – mostly on our behalf – and at the same time encourage their introduction of large-scale development of yet more factory farming systems.

It is clear that the government's *laissez faire* attitude to the industrial sector applies equally to the meat and dairy industries. These are as much industrial products as cheap power tools or plastic Power Rangers, only

more damaging. Even if it wanted to act on the latest desperate warnings, the lobbying power of the agricultural, pharmaceutical, manufacturing and food marketing sectors of the economy will ensure behind the scenes arm twisting on an intergalactic scale.

Part of the popular media has largely decided that global warming is a sham and encourages every half-baked and unscientific denial. The *Daily Mail* has made climate denial editorial policy. You can imagine the outcry these titles will whip up if our 'brave farmers' are threatened. Newspapers and magazines are, of course, an integral part of the consumer society and depend upon mass advertising for a large chunk of their revenue, much of it for meat, dairy and leather products.

with the environment, and global warming in particular, the major problems do not become apparent until long after it is too late to do anything about them

We are therefore facing a watershed in the way our society is governed and our attitude to the planet on which we live. The policy decisions that are so vitally needed may be a long, long way off. With the Intergovernmental Panel on Climate Change (IPCC) warning that as far as global warming is concerned it may already be too late, action is needed now not a decade or two down the line.

Fortunately, you can exercise your freedom of choice and have an immediate impact on the world. Give up meat, fish and dairy now, adopt a vegan diet and reduce the impact of global warming, end the mass suffering of animals, slow the advance of antibiotic-resistant superbugs, end your part in the clearing of forests, the spread of deserts, the loss of species and the waste of fresh water.

It is an extraordinarily empowering decision and the only tragedy is that there are so few voices prepared to advocate it.

The one thing we cannot do is allow market forces to determine what happens. Even if you believe that markets work, they will not and cannot in this situation. Central to their working is their ability to adapt and change as circumstances develop or problems arise.

With the environment, and global warming in particular, the major problems do not become apparent until long after it is too late to do anything about them. Once global warming passes the tipping point, enters into positive feedback and becomes unstoppable, which the IPCC thinks may already have happened, our free marketeers will be impotent.

Make no mistake, effectively tackling environmental decline is going to result in a battle that pits ordinary, concerned people against huge vested interests and weak governments. In fact, it has already started!

GLOBAL WARMING

The processes through which greenhouse gases trap heat and warm the Earth are now well established. That it is human activity which carries the blame is also well established by an almost unique scientific consensus that has probably never been seen in living memory.

Former US vice president Al Gore, in his Nobel Peace Prize-winning film, *An Inconvenient Truth*, spelt out the extent of that consensus – published scientific papers that establish human responsibility for the problem: almost 1,000. Scientific papers showing it's got nothing to do with humanity: zero. US media reports on the same issue show a very different slant: 68 per cent in favour of global warming being a natural phenomenon and 32 per cent supporting the scientific consensus.

The ratio may not be quite so wide in the UK but there is still nothing like balance in the debate. Climate change denial, or at least humans' responsibility for it, has become editorial policy in the *Daily Mail*, including its science editor. Some other papers and the BBC adopt an 'even-handed' approach, providing equal space for denial and therefore presenting the debate as one which is evenly divided in terms of scientific opinion.

Incredibly, when the UN FAO published its report in 2006, establishing that livestock are not only the second largest source of greenhouse gases but central to every other environmental catastrophe, it was virtually ignored in Britain. What should have been an Earth-shattering report was carried by three titles, two of them agricultural papers.

The delicate nature of the Earth's atmosphere was spelt out:

> *"The atmosphere is fundamental to life on Earth. Besides providing the air we breathe it regulates temperature, distributes water, it is part of the key processes such as the carbon, nitrogen and oxygen cycles and it protects life from harmful radiation. These functions are orchestrated in a fragile, dynamic equilibrium by complex physics and chemistry."*

This 'fragile and dynamic equilibrium' is being altered and we can only guess at the outcome but it will not be beneficial. Livestock and industrial fishing carry a large share of the blame and constitute the second largest source of greenhouse gases.

The gas most damaging for the environment is CO_2 because of the quantities that are produced. The second most damaging is methane, 21 times more effective at trapping heat than CO_2 and which remains in the atmosphere for nine to 15 years. Nitrous oxide is the third most damaging, has 296 times more global warming potential than CO_2 and retains its effect for 114 years.

livestock and industrial fishing... constitute the second largest source of greenhouse gases

Livestock (and the processes to feed, transport, kill and manufacture meat) are responsible for considerable amounts of all three gases. For example the UN FAO states:

- A large share of the world's crop production is fed to animals. Nitrogen fertilizer is applied to much of the cropland. Fossil fuel used in the manufacturing of fertilizer may emit 41 million tonnes of CO_2 per year.
- Livestock on farm use of energy (eg for pesticides, diesel, electricity) causes even greater emissions – 90 millions tonnes of CO_2 per year.
- Livestock related land use changes (such as forest clearance, biomass burning) may emit an astonishing 2.4 billion tonnes of CO_2 per year.
- Releases from livestock-induced desertification may total 100 million tonnes of CO_2 per year.
- Methane from enteric fermention: 86 million tonnes per year.
- Methane from animal manure: 18 million tonnes per year.
- Livestock contribute 65 per cent of global human-related nitrous oxide emissions – the largest cause being from both applied and deposited manure.
- The UN FAO estimates that livestock are responsible for 18 per cent of global warming gases compared to 13.5 per cent for all the world's different forms of transport combined. Interestingly, the sector the UK government has chosen to pillory is air travel, responsible for just three per cent of global warming gases. Again, its special relationship with livestock producers results in inertia when immediate and far-reaching action is demanded.

Concentrations of CO_2 are higher than at any time in the last 650,000 years, methane has doubled since pre-industrial days and average temperatures have increased by 0.8 deg C (2005). What international attempts

have been made to address the issue at Cancun and Kyoto have been abject failures as no country is prepared to risk its industrial growth in order to seriously address global warming. Individual organisations are, however, beginning to find their voices.

In 2005, the University of Chicago's department of geophysical sciences examined the amount of energy used by different food industries. In addition to what the animals produced themselves, the amount of fossil fuel energy used to grow fodder for farmed animals and in processing is considerable; as is the nitrous oxide from slurry lagoons. It found that the worst offender is red meat in terms of the amount of greenhouse gases produced; followed by fish (largely due to industrial methods of catching), then dairy, then poultry. Vegan diets are the least harmful by far. If someone ate 26 per cent of calories from red meats then they would contribute 2.5 tonnes more of carbon dioxide equivalent per year than a vegan – more than the average output of many types of car over the same time span.

Their conclusion: "However close you can be to a vegan diet and further from the mean American diet, the better you are for the planet".

The Washington-based World Watch Institute has also been forthright in interpreting its research:

> *"As environmental science has advanced, it has become apparent that the human appetite for animal flesh is a driving force behind virtually every major category of environmental damage now threatening the human future."*

Earthsave International has done its own research and is equally vocal about the damaging effect farmed animals are having on climate change. It maintains that animal agriculture is responsible for over 100 million tonnes of methane a year – 85 per cent from digestion and 15 per cent from slurry lagoons.

> there appears to be a direct link between dietary preferences, agricultural production and environmental degradation

Its conclusions are: "The best way to reduce global warming is to reduce or eliminate our consumption of animal products. Simply by going vegetarian (or, strictly speaking, vegan), we can eliminate one of the major sources of methane."

As developing countries such as China emulate the West's addiction to animal products, the Profetas study, set up by the three Dutch universities of Twente, Waganingen and VUA maintain that the situation is accelerating away from us. The 19 academics involved maintain that "this trend must be reversed on a global scale". We should all be looking to make the transition from meat protein to vegetable protein alternatives (novel protein foods) based on such plants as soya. Doing so will positively affect everything from sustainable energy and water use to biodiversity, human health and animal welfare, they maintain.

A joint study by Amsterdam University and Loma Linda University, California attempted to assess the benefit of switching from a meat protein to a vegetable protein diet on a variety of inputs, including energy. On every count, meat, dairy and fish consumed more energy and made a greater negative impact on the globe than vegetable protein.

On land requirement, they established that on average, 10g of vegetable protein was needed to generate 1g of animal protein but the rate varied with different animals. For broiler chicken production the conversion rate was 16 per cent (nearly six to one in favour of vegetable protein); on pork it was 9 per cent (11 to one) and beef, six per cent (17 to 1).

In the comparison between meat production and soya-based vegetable protein production, this translates into meat requiring between six and 17 times more land. On fossil fuel energy use the difference globally is a staggering two-and-a-half times to 50 times greater for meat while in Europe it is between six and 20 times greater.

The use of cheese made from lupine (white lupin seeds/beans) was compared with cow's milk cheese but only for land use and pollutants. The environmental burden of the cow's milk cheese was 19 to 21 times greater than vegetable-based cheese.

The study also considered the energy demands of fish eating and established that trawling, the most common method of fishing in Western Europe for bottom-feeding fish, required 3.4 litres of fuel oil per kilogram of fish. This translates into an energy demand approximately 14 times greater than for vegetable protein.

For mid-water gill net fishing the demand was lower, at 0.4 litres of oil per kilogram of fish and an overall energy demand 65 per cent greater than for vegetable protein. However, when processing is added into the equation the overall demand on fossil fuels is between 20 and 44 times greater for fish than for vegetable protein.

The rapid development of fish farming – aquaculture – is sometimes offered as a solution to fishing and diminishing stocks. The study found that in terms of pesticide and fungicide use and the release of damaging nutrients into the environment there was little difference between fish farming and other forms of intensive animal farming. It goes on to say that the farming of carnivorous fish (most farmed fish are carnivorous) "probably poses a relatively heavy environmental burden." The report goes on:

> *"Many scientists and even policymakers have begun to question the sustainability of agriculture as practised today. Particular scepticism has been directed at supporting the increased demand for animal products…. Throughout the world there appears to be a direct link between dietary preferences, agricultural production and environmental degradation."*

It continues:

> *"Encouraging individuals to eat more efficiently, consuming less meat and more plant-based foods, may be one of the measures that will lead to increased sustainability and reduced environmental costs of food."*

The findings of this particular study have been reflected by many other studies over a decade or more with similar results to a greater or lesser degree.

Soya has become both a demon and a saint. Its demonic status is the damage its production for animal feed causes to the environment while its saintly status is the potential it has to feed the world efficiently and sustainably. It has become fashionable to blame vegetarians and vegans for deforestation because of their consumption of soya.

In fact, 80 per cent of soya is fed to animals and the bulk of the remainder is used in mainstream food production as padding for such things as meat pies and other processed products. Only a tiny proportion is currently used for the manufacture of mock meat vegetable protein.

Despite this there is a sustained and growing attack on soya from pseudo scientific sources, presenting it as a serious health risk to humans because of its plant

'oestrogen' content. The Vegetarian & Vegan Foundation recently reviewed the science on soya and found no adverse effects – in fact it is a valuable and wholesome addition to the diet, evidenced by the fact that 25 per cent of US children have been fed soya infant formula for almost 40 years and exhibit no adverse effects.

It is perhaps not surprising that the main source of these supposed warnings is an organisation that declares that humans need to eat meat and saturated animal fat and full-cream milk in order to be healthy. Just another member of the denial brigade but adopting different tactics.

The pressure that livestock exert on the environment is extreme and patently unsustainable. In terms of greenhouse gases, it is not just the emissions from production and processing that are of concern but the fact that livestock reduce the capacity of the planet to absorb CO_2.

One of the greatest CO_2 sinks is soil itself and as the hooves and overgrazing of animals degrade it so it releases the CO_2 it holds captive. That soil then loses its ability to absorb further CO_2 from the environment. Similarly with the loss of forests; not only are huge quantities of CO_2 released by the slash and burn practices of deforestation, the loss of vegetation ensures that there is a reduction in new growth to absorb future emissions of $C0_2$.

The results are almost farcical – governments wringing their hands about climate change while increasing their country's emissions and supporting policies and practices that reduce the planet's ability to absorb CO_2. The situation is set to worsen as raised sea levels inevitably flood large areas of fertile land, both reducing the size of the carbon sink and reducing agricultural output.

Evidence of a reducing ability to absorb CO_2 is already there, according to the Global Climate Project in Canberra. Its report claims that about half the CO_2 emissions resulting from human activity have historically been absorbed by these natural sinks on land and in the oceans. Fifty years ago, for every tonne of CO_2 produced, 600 kg was absorbed but in 2006 it was only 550 kg and reducing.

Corinne Le Quere, climate researcher with the British Antarctic Survey in Cambridge explained that stronger winds in the Southern Ocean caused by global warming and the loss of the ozone layer has resulted in more dissolved carbon dioxide in the deep sea being brought to the surface and consequently less carbon dioxide being absorbed from the atmosphere. She said:

> *"This is incredibly important. It is bad news because we can't do much about these natural carbon sinks. Things are happening much faster than we expected."*

The reason why more and more academics are being galvanised into action is because the scientific models which predict what's likely to happen with global warming are clearly wrong – it is all happening far, far quicker than anyone believed – three-times faster than predicted in the 1990s with sea levels rising twice as fast as predicted, according a study by the US National Academy of Sciences.

Professor David King, scientific adviser to the UK government, says that levels of CO_2 in the atmosphere are "higher than we've seen for over a million years, possibly 30 million years".

The situation is compounded by the effects of Kyoto, the international agreement that was supposed to save us with such things as carbon trading and carbon credits. It has produced incompetence, abuse, few savings but huge profits, according to a *Guardian* investigation.

Two studies in the science journal *Nature* claim that glaciers and arctic ice sheets are melting so fast that we could be heading for catastrophic rises in sea levels – several metres by the end of the century.

The prestigious publication *Proceedings of the National Academy of Science* has also expressed serious concern. Its major worry is that once average temperatures rise by 3°C – and that is well within the range predicted – atmospheric CO_2 that is currently absorbed by plants will be outweighed by the CO_2 produced from the soil in which they stand as a result of organic decomposition.

This is one of several tipping points, the trigger for positive feedback or the point of no return – phrases that are being increasingly used but all amount to the same thing – global warming will become unstoppable, with unknown consequences.

A report in *New Scientist* revealed that the vast permafrost peat bogs of Siberia are no longer perma and have started to thaw. Methane is a gas 21 times more damaging than CO_2 and over the coming decades, Siberia is likely to emit 70 billion tons of methane.

The outcome is likely to be that global temperatures will rise even faster and higher than the current revised estimates and defrost more tundra, which will release more methane in another positive feedback scenario.

"When you start messing around with these natural systems", says David Viner, senior scientist at the Climate Research Unit at the University of East Anglia, "you can end up in a situation where it is unstoppable. There are no brakes you can apply."

The situation is likely to be made worse by the warming of the Arctic Ocean, triggering even greater methane releases from the sea bed. According to Michael Meacher, one-time Labour environment minister, this process could make the planet uninhabitable for humans. Such candour helped to lose him his job.

A far-sighted report by European meat industry vets written in 1990 had already said the unsayable: "Nature might be totally unpredictable if knocked out of balance. We are not able to destroy the Earth but we might change the climate in an unpredictable direction – at worst endangering our survival as a species".

Professor Peter Cox of Exeter University reported to the Royal Geographical Society in 2007 that this tipping point could be reached as early as 2050.

In the face of all this, the role of the US government has been reprehensible both in originally refusing to admit climate change and attempting to undermine the science behind it. Why else would president Bush have appointed Philip Cooney – an oil industry lobbyist without a science degree to his name – as head of his environment office? His contribution to the problem was to rewrite the warning papers of government scientists, altering words such as 'will' to 'may'.

When he was eventually caught and resigned, he walked into a job at oil giant Exxon Mobil the very next day. Pure coincidence, of course, that Exxon generously funds almost the entire denial industry. If ex-vice president Al Gore hadn't exposed this in his Nobel Peace Prize-winning film, *An Inconvenient Truth*, we would probably have remained ignorant.

Another step taken by Bush in 2007 was to invite 16 major economies to form a climate change forum essentially in opposition to the UN. It evoked rare criticism from the UN secretary general Ban Ki-moon. He told a meeting of world leaders and scientists that the effort to control climate change …"will succeed or fail based on the strength of leadership and commitment displayed by the people in this hall."

The US is responsible for 25 per cent of the world's pollution and greenhouse gases and has shown no strength, leadership or commitment. Its refusal to agree caps on emissions, not to approve any policy that might impinge upon the profitability of US industry and to actively attempt to undermine the UN Intergovernmental Panel on Climate Change (IPCC and joint winners of the Nobel Peace Prize with Al Gore) illustrates that there is little hope of the global action required to avoid catastrophe.

the point considered to be the threshold for catastrophic climate change... is now very unlikely to be avoided

The urgent need for action is illustrated by the IPCC, despite having been previously accused of watering down the science on climate change. Prof Martin Perry, a senior Meteorological Office scientist and co-chairman of the IPCC committee, spelt out a stark warning when presenting the committee's latest report to the Royal Geographical Society in London in September 2007.

He said that a rise of two degrees centigrade in global temperatures – the point considered to be the threshold for catastrophic climate change – is now very unlikely to be avoided. In UN-speak that is interpreted as there being between one and 10 per cent chance of averting disaster.

"Even if we agree a cap at two degrees, there is a stock of major impacts out there already … You

cannot mitigate yourself out of this problem… The choice is between a damaged world or a future with a seriously damaged world."

This damage will include between 350 and 600 million people in Africa suffering water shortages; a fall in agricultural yields of up to one half; and a spread of eight per cent in arid areas. In Asia, a billion people will suffer water shortages as the Himalayan glaciers melt and crops yields will fall. In Latin America 77 million people will lack water and tropical rainforests will become Savannah. Of course, storms, tempests and widescale flooding will feature everywhere.

It is against this background that the denial industry flourishes, with the encouragement of the US government. There is perverse logic to the world's most profitable oil company denying climate change but tobacco giant Philip Morris is also involved, as George Monbiot points out in his book *Heat* (Allen Lane). Why? Because the belief is that if you can undermine sound science on one front, you weaken it on all fronts!

As well as having powerful political patronage, a diverse range of corporations have joined together to rubbish scientific research through puppet organisations such as the Advancement of Sound Science Coalition. In Philip Morris's case it is to throw doubt on the claim that passive smoking kills but alongside them are biotech companies who promote GM foods and the nuclear industry. Together, their aim is to reduce 'over regulation', promote 'sound science' and discredit 'junk science'. By junk science they mean anything which threatens their profits and by sound science they mean their own pseudo-scientific denials.

Some sections of the media are willing accomplices in this and typical of its coverage was an article in 2007 in the *Daily Mail* headlined, 'Global Warming? It's natural, say experts'. The 'experts' turned out to be activists from the Hudson Institute and not climate scientists.

The Hudson Institute is firmly aligned to big business, closely associated with the Bush neo-conservative clique which has fought bitterly to deny climate change and refused to act to reduce it. Herman Khan, the founder, actively encouraged the idea of winnable nuclear war. These and similar organisations have huge resources, enormous political clout and have successfully confused the debate on climate change. And there is much more to come from them.

Governments appear to be complicit in this lack of action. When Viva! wrote to Defra (Department for Environment, Food and Rural Affairs) to ask what action they intended to take as a result of the UN FAO report, its Customer Contact Unit replied. It said that eating meat and dairy was a personal choice and that methane from landfill sites was part of the problem. If vegetarians cut down their vegetable waste it would help reduce climate change!

In the past Viva! has written at length about Australia's imbecilic policy of allowing 180 million alien cattle and sheep to destroy its fragile environment. The pay back is that the country is suffering the worst drought on record and the farmers who have resisted all curbs on livestock production now face possible devastation. And drought has reappeared in the US, the worst since the great depression.

Hardly surprising, six scientists from some of the US's leading scientific institutions have delivered an unambiguous warning that civilisation itself is threatened by global warming.

Writing independently in *Physics World* magazine, physicist Alan Calverd calls for a veggie world because of emissions. He claims that getting rid of meat animals is not only the easiest way to reduce greenhouse gases but would also free up huge tracts of farmland for growing biofuels, which would further reduce carbon dioxide emissions.

The dominance and inviolability of cattle farming is summed up by the Bush administration's policy decision to allow farmers greater grazing access to the 160 million acres of public land. It based its decision on a report from the Bureau of Land Management (BLM) which concluded that grazing would be beneficial. Two retired scientists who helped compile the report have recently spoken out.

"This is a whitewash", said Erick Campbell, a Nevada state biologist who looked at wildlife impact. "They took all our science and reversed it 180 degrees. They rewrote everything. It's a crime!" Hydrologist Bill Brookes considered the impact on water and is just as unhappy: "Everything I wrote was totally rewritten. Instead of saying that, in the long term, grazing will create problems, it now says it's the greatest thing since sliced bread."

one of the most effective actions anyone can take to reduce their own carbon footprint is to change their diet to one based on plants: to go vegan

The bald statistics on greenhouse emissions from animal agriculture are bad enough – at 18 per cent, the second largest source. But the true figure is greater than this. The destruction of biomass and the degradation of soil impair the planet's ability to absorb future CO_2. And to these concerns need to be added the carbon emissions from fishing.

One of the most effective but least reported actions anyone can take to reduce their own carbon footprint is to change their diet to one based on plants: to go vegan.

It has other profound advantages, too. It reduces their impact on desertification, deforestation, water and air pollution and the other issues covered in this report.

DEFORESTATION & LOSS OF BIODIVERSITY

The loss of forests and the loss of biodiversity are almost one and the same thing as forests contain 60 per cent of the world's extraordinarily rich selection of flora and fauna. They also play a vital role in climate regulation and are an important sink for carbon. Livestock are one of the major causes of deforestation, almost certainly the major cause.

During the 1980s as much as 15 million hectares of tropical forest were destroyed every year. In the 1990s, a decade when awareness was probably at its highest, the devastation accelerated. Between August 2003 and August 2004, 700,000 hectares were destroyed in Brazil alone – an area the size of Belgium.

It is estimated by the Global Forest Resources Assessment that forest covers less than 30 per cent of the total land surface. In Britain it is under five per cent of primary forest for a land that was once 80 per cent forested.

The destruction of forests has continued unabated, at a rate of 8.9 million hectares annually in the decade to 2000 and 7.3 million hectares annually between 2000 and 2005. Official estimates often offset this loss against the planting of new forests, which have been running at 2.8 million hectares since 2000. However, many of these forests are monocultures and offer not a fraction of the biodiversity of the primary forests which have been destroyed.

The process of slash and burn – cutting down undergrowth saplings and unwanted trees and burning them – eradicates all growth and unlocks centuries worth of stored CO_2 in only minutes. Tropical deforestation is responsible for approximately 20 per cent of the total of human-caused (anthropogenic) carbon dioxide emissions.

There are several causes of deforestation, which include logging, acid rain, clearing by landless and poverty-stricken farmers, urbanisation and fire but the overwhelming reason is ranching and the growing of fodder crops. What really kick-started this wholesale destruction was an explosion decades ago in the US fast-food hamburger market. It required masses of low-quality cheap beef reasonably close at hand. In 1996, the US imported 80 million pounds of beef from Brazil. Meat is also imported from other Central and South American countries.

It has been estimated that just one hamburger made from Costa Rican beef results in the eradication of one large tree, 50 saplings, seedlings from some 20-30 different species, hundreds of species of insects and a huge diversity of mosses, fungi and microorganisms.

To make the situation worse, Burger King, Wendy's, McDonalds and all the other multinational chains, have exported the hamburger culture to every corner of the world, increasing the global demand for beef.

When an economic value is applied to rainforests, it is estimated that when sustainably harvested for fruits and latex, one hectare of Peruvian Amazon rainforest is worth £3,762. The same area of land is worth only £551 for clear-cut timber and a paltry £81 as pasture.

Very little is said about the 60 million people who live in the forests and depend upon them for their homes, their source of survival and spirituality and their culture. Their deep knowledge of these wondrous places counts for nothing and they are accused of standing in the way of progress in the scramble to supply the world with beef and other meats.

> deforestation is a policy not a mistake and livestock – or rather the profits that can be made from them – are the driving force behind it

Europeans have made their own contribution to this destruction with their ever-increasing dependence upon cheap meat. Most of the high-protein supplements fed to Europe's livestock come from the developing world and increasingly from Brazil in the form of soya. Europe is the key market for soya from the felled Amazon rainforest with some18 million tons being imported annually.

This feed finds itself indirectly part of just about every piece of fast food fried chicken, burger, cheese pizza, sausage or bacon sold across the EU.

According to Greenpeace there are just three large corporations controlling the trade – the ADM Corporation (Archer Daniels Midland), Bunge and Cargill. These giant companies provide everything farmers required to rape the forests, including pesticides and fertilisers, transport and storage. In 2004-2005, 1.2 million hectares were planted with soya in the Amazon.

It has been argued that soya production follows deforestation for logging and cattle ranching and is not the reason for it – but this is no longer true. Huge tracts of forest are being cleared, often by slave labour, specifically for soya production.

The current situation is that 70 per cent of cleared Amazon rainforest is used for ranching – for the grazing of hamburger cattle – while most of the remaining 30 per cent is used for growing soya animal feed production.

Sadly it is a game without end as the soils of rainforest land are thin and after a few years of being saturated with agrochemicals they become unproductive and the process of clearing and burning is repeated.

This is not simply a Central and South American problem but is happening across the world and has been constant throughout history. Europe lost most of its primary forests in the 19th century but the lessons still haven't been learned and clear felling continues in Canada, US and Australia and often for reasons of animal agriculture.

Developing countries across the world are encouraged to increase exports by the World Bank and the IMF, who fund road building into forests to facilitate it. These, of course, provide access to loggers and make raw materials accessible, which is closely followed by global corporations such as Cargill who begin the process of destruction.

Deforestation is not something that happens accidentally because governments and industry are unaware of the problems. It is a process that takes place because all those responsible work in cooperation to make it happen. Deforestation is a policy not a mistake and livestock – or rather the profits that can be made from them – are the driving force behind it.

The loss of forests is not an abstract process but has far-reaching implications, most of which we are unaware until it is too late. The UN FAO believes that livestock are the major cause of biodiversity loss (the loss of plant and animal species) as they are the major cause of deforestation.

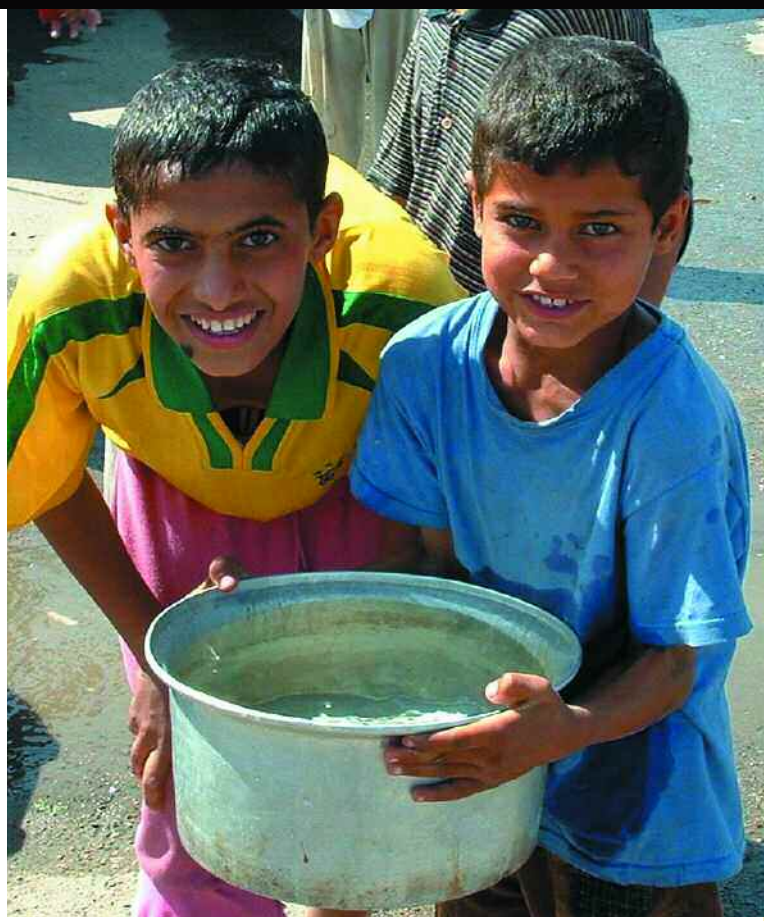
The Millennium Ecosystem Assessment (MEA, 2005) estimates that species are disappearing 100 to 1000 times faster than should be expected on the basis of fossil records. It believes that one-third of all amphibians, a fifth of mammals and one-eighth of all birds are now threatened with extinction. This is based on known species and yet it is estimated that 90 per cent of all existing species are unknown and so the true rate of extinction could be 10 times greater than that estimated by the MEA.

Valuable sources of sustainable timber, food, clothing and potential medicines are being eliminated and essential contributions to recycling of nutrients, pollination, seed dispersal, climate control and purification of air and water are being trashed without a second thought. This is much more than simply a moral issue.

As there is essentially no longer a supply of new land anywhere in the world, if the meat and dairy industries continue to expand there will be further encroachment into the planet's remaining forests and wildernesses and a rapid intensification of agriculture on the land that is already being used. It is a deeply depressing scenario which will ensure that the environment continues its remorseless trend towards making life extremely difficult for us as a species or even impossible.

This is the opinion of Viva! and many serious environmental scientists.

OVERUSE OF FRESH WATER



Fresh water is in short supply! Only 2.5 per cent of all water on the planet is fresh and 70 per cent of this is locked up in glaciers and permanent snow. What was once a slow process of summer melt and winter renewal fed rivers and aquifers the world over. With global warming, glaciers are disappearing at an unprecedented and accelerating rate and the valuable fresh water is simply running into the sea.

Currently, more than 2.3 billion people in 21 countries live in areas which are classified as 'water stressed' while a further 1.7 billion live in areas of scarcity. More than one billion people have little access to clean water. In is in these areas where most agricultural expansion and population growth are taking place.

As a direct consequence of the increase in water demand – the majority for agriculture and the lion's share of this for animal agriculture – 64 per cent of the world's population will live in 'water stressed' areas by 2025. An International Water Management Institute assessment in 2000 estimated that one-third of the world's population will live in areas of 'absolute water scarcity'. These include Pakistan, South Africa and large parts of China and India.

Agriculture is the biggest user of fresh water, demanding 70 per cent of all that is available while in many third world countries the figure is as high as 85-95 per cent. Agriculture also accounts for 93 per cent of all depletion – drawing water unsustainably from underground aquifers, for example.

As the UN FAO says, decision makers often do not understand the demand that livestock make on water both directly and indirectly and as a consequence they simply ignore it. In fact, livestock's use of water is high and growing.

There are various figures available to show how much more water is required to produce meat than plant foods and they vary considerably in detail but the overall evidence is consistent – meat and dairy require hugely more water.

Water constitutes 60-70 per cent of the body weight of most animals and a cow will drink up to 127 litres a day, a pig 46.7 litres and 100 chickens up to 62 litres. The water used for cleaning, processing and slaughtering

chickens alone can amount to 15 litres per kilo – more than 60 litres per bird.

It takes 1000 litres of water to produce one kilogram of wheat, yet it takes 100,000 litres of water to produce one kilogram of beef. The University of California studied water use in their state, where most agricultural land is irrigated, and said it uses between 20 to 30 gallons of water to produce vegetables such as tomatoes, potatoes and carrots to create one edible pound of food. It takes 441 gallons of water to make a pound of beef.

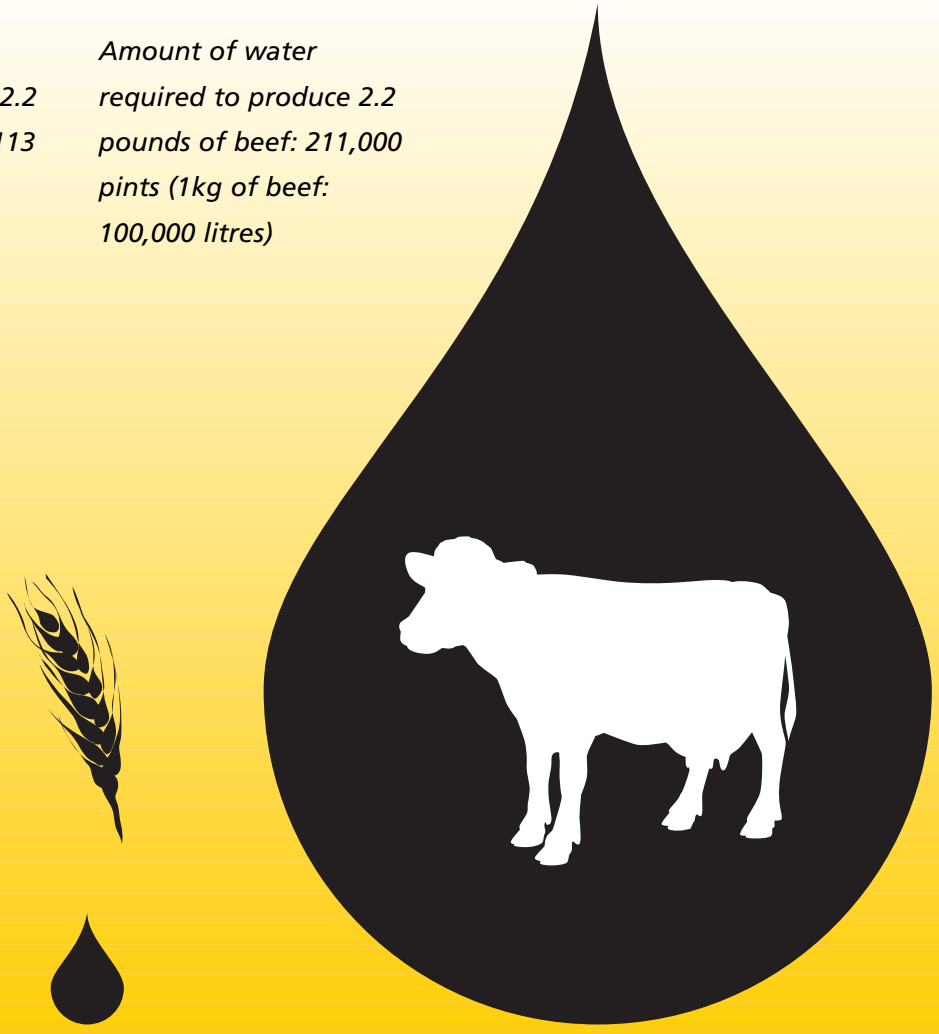
The disappearance of fresh water in many regions poses a real threat to the stability of the world. Numerous countries are in dispute over water supplies and the seeds of future wars are clearly beginning to germinate.

agriculture is the biggest user of fresh water, demanding 70 per cent of all that is available

Just as has happened with the supply of available land to produce food, those with commercial interests and capital will demand the majority whilst the poor and impoverished will go without. This is an appalling judgment on the values of our so-called civilized society.

Amount of water required to produce 2.2 pounds of wheat: 2,113 pints (1kg of wheat: 1,000 litres)

Amount of water required to produce 2.2 pounds of beef: 211,000 pints (1kg of beef: 100,000 litres)



Source: *No Nonsense Guide to Climate Change* by Dinyar Godrej (New Internationalist Publications Limited)

DESTRUCTION OF THE OCEANS

©Damien Bird

The addiction to animal protein that is wreaking havoc on earth is matched by the devastation being caused to the oceans by overfishing for yet another source of animal protein. As on land, the situation is exacerbated by large-scale pollution.

Fishing is one of the most monitored, researched and studied of activities carried out by humans and yet this 'management' has been futile and ineffective in safeguarding the oceans and its creatures. Humankind's mismanagement of the seven seas is a lesson in stupidity, greed and disregard for the natural world.

Canada is an example of how little is understood about the complexities of the marine ecosystems. In the 1960s, 800,000 tons (imperial) of cod were caught every year off the East coast of Newfoundland. In 1975, only 300,000 tons could be found and by the 1980s it was down to 250,000 tons. Despite this rapid decline, scientists continued to give the go-ahead claiming that a catch of this size was sustainable indefinitely.

In 1992, devastation struck with a complete collapse of the fishery. Total cod stocks in these once teeming waters were estimated at just 1,700 tons. Again scientists showed there lack of understanding when they maintained that stocks would quickly recover. They didn't and show no signs of doing so.

Icelandic and European cod stocks are now heading in the same direction. There is no argument that fishing at

the present level is unsustainable and yet the number of fish caught has doubled in 30 years.

In 2003, the UK had 7,283 fishing vessels which landed 631,000 tonnes (metric) of fish valued at £521 million. A further 200,000 tonnes valued at £1,437 million was imported. The total global catch stood at 93.2 million tonnes in 2002 with a further 39.8 million tonnes from fish farms.

The year 2000 was the high water mark for fish catches when 94.8 million tonnes was caught. Despite bigger ships and high tech gear such as fish-finding sonar and satellite navigation, largely funded with massive subsidies, the global catch is now declining.

In 2002, the UN FAO declared that 75 per cent of the world's fisheries are either fully exploited, over exploited or significantly depleted. In 2003, the International Council for the Exploration of the Seas (ICES) issued a warning that only 18 per cent of fish stocks were within safe biological limits – in other words, 82 per cent of all fish stocks are on the road to extinction.

When one species has started to decline, the industry has simply moved on to another species and no attempt is made to monitor the effect of exploiting these often new species. In the 1980s, they began to exploit some of the world's deepest oceans and effectively swept the sea bed clean of fish. Most were turned into fish cakes and crab sticks.

At these extraordinary cold depths fish grow and reproduce very slowly, some species living for 150 years and reproducing only when they reach 30. Stocks have now collapsed but the huge investment in gear means that the fishing continues.

As well as seeking new species of fish, the fishing industry is constantly descending the marine ladder – fishing lower and lower down the food chain. Catching ever-smaller fish seriously compromises the recovery of depleted big fish.

There have been many studies charting the decline of fish stocks, including one in 2003 which found that 90 per cent of common fish such as tuna, cod, halibut and flounder have disappeared since the 1950s. Cod, sturgeon, skate, haddock, swordfish and all species of tuna, except skipjack, are listed as vulnerable or globally endangered by the World Conservation Union.

According to the Commission for the Protection of the Marine Environment of the Northeast Atlantic (OSPAR), 40 of the 60 main commercial fish stocks in this huge area risk extinction or are being heavily overfished. It is a similar story in the North Sea and Baltic. One half of all the fish landed by UK ships in 2004 were from unsustainable sources. Even the noble salmon has seen its numbers collapse by half in 20 years, according to the Marine Conservation Society. This magnificent species is now listed as 'threatened' by OSPAR.

The extraordinary number of warnings and recommendations from the most authoritative sources has been consistently ignored by politicians. In 2002 and 2003, ICES called for a total ban on cod fishing in the North Sea, Baltic and Irish Seas and an end to deep water fishing. It was ignored. In 2004, the Royal Commission on

Environmental Pollution (RCEP) called for an end to deep sea trawling in UK waters and the closure of 30 per cent of coastal fishing grounds. It was ignored. It also demanded that the seas should be treated similarly to an endangered land habitat. It was again ignored.

In fact, EU fishing policies are exacerbating the situation, as Fisheries Commissioner Joe Borg made clear in 2007. He revealed that every year, billions of fish are dumped back in the sea – 500,000 to 800,000 tonnes – because they are too small or are in excess of the allowed quota. Almost all these discarded fish die. Worst offenders are sole fishermen in the Southern North Sea whose small mesh nets capture almost everything, with up to 90 per cent of the catch being discarded. A similar situation exists all over the world.

Rather than being called to account for this vandalism, between 2000 and 2006, the EU provided 4.1 billion Euros in subsidies to the fishing industry, with individual countries providing a further 2 billion Euros.

The rape of the oceans for fish is only one aspect of the onslaught they face. Pollution with flame retardants, PCBs, dioxin, mercury and other persistent organic pollutants, along with pesticides, fertilisers and heavy metals from farming, have contaminated virtually every oceanic creature. The higher up the food chain, the greater the concentration of pollution.

We can only guess what the long term effects of this will be on sea creatures and those humans who eat them, thus placing themselves at the very top of the food chain. Despite this, the UK government promotes fish for health because of the omega-3 essential fatty acids it contains when there are better, safer and pollution-free plant sources readily available.

FISH FARMING

One of the supposed solutions to overfishing is aquaculture, the farming of fish, but sadly it is part of the problem and not part of the cure.

In 2002, fish farming accounted for 39.8 million tonnes of global fish production. As wild stocks decline, fish farming fills the gap and is the fastest growing sector of the world food economy. In the UK, it is the second largest livestock sector after broiler chickens with almost all the fish being intensively reared. Almost every supermarket salmon is factory farmed as increasingly are trout. Cod is now also being farmed.

UK production is dominated by two species – salmon (96 per cent) and fresh-water trout (3.7 per cent). Scottish lochs are a favourite location, with 340 salmon farms. Production increased from 800 tonnes in 1980 to 145,609 tonnes in 2002. Globally, the annual production of farmed salmon grew 16-fold to over one million tonnes between 1985 and 2000, overtaking the catch of wild salmon.

According to the World Watch Institute: "No form of aquaculture chews through more of the world's marine life than does salmon farming." Salmon and most other farmed fish are fed pellets primarily made up of wild-caught fish such as anchovies, mackerel and capelin.

For every tonne of farmed salmon produced, three to four tonnes of 'industrial' fish are caught. In just 15 years, stocks of South American pilchard crashed by 99 per cent in order to feed farmed fish.

Because of the cramped conditions in fish farms, sea lice and disease are rife and so fish farmers have resorted to using pesticides, antibiotics, disinfectants and growth promoters in exactly the same way as livestock farmers. As lice are crustaceans, the pesticides used to combat them also kill lobsters, crabs and shrimps.

> no form of aquaculture chews through more of the world's marine life than does salmon farming

Fish farming is not, of course, solely a UK or European problem but is devastating some of the most important habitats in the world. Mangrove forests are extraordinary places which fringe much of the world's coastline and provide the most productive and vital habitat in all the oceans. Ninety per cent of marine fish rely upon them for spawning and over 2,000 species of fish, crustaceans and plants thrive there yet these extraordinary places are being trashed faster than anyone can count and are being replaced with shrimp farms.

Intensive shrimp farms are productive for just 10 years before being abandoned – usually moving elsewhere and destroying more mangroves and more communities. The land left behind is effectively dead – too saline for aquaculture and for the mangroves to regenerate.

Mangroves once covered three-quarters of the coastlines of tropical and sub-tropical countries such as Thailand, Malaysia, Ecuador, Panama and others. Today, less than 50 per cent remains and more than half of this remnant is degraded. Nearly one quarter has been destroyed in the last two decades, again primarily for shrimp farms.

DESERTIFICATION

The world's topsoil is its lifeblood and without it almost nothing will grow. It is essential for life and yet it is under such constant attack that it is retreating, disappearing or degrading almost everywhere animals are farmed. The onslaught comes from two sources – direct grazing by animals and denaturing due to the excessive use of pesticides and fertilisers used in an attempt to artificially boost productivity of fodder crops.

Forty per cent of all agricultural land has been degraded in the last century because of compaction by the hard hooves and heavy bodies of animals along with nutrient depletion and pollution. The problem is greater in some areas than others. The UN FAO maintains that about 20 per cent of pastures and rangelands are degraded in the more fertile areas of the world but in the arid and semi-arid lands, which girdle one third of the Earth, the figure is as high as 73 per cent.

Ex-rainforest land is particularly prone to deterioration as the soil is comparatively thin. It has adapted over thousands of years to support the forest with its network of roots but these also hold the soil together. Cattle and other grazing animals make short work of breaking down the soil's structure.

Loss of trees and green vegetation have other effects. They no longer act as a sponge, soaking up heavy rainfall and instead it floods off the land carrying top soil with it. When this silt reaches the ocean it can smother much of the life there.

However this process eventually ends as the loss of evaporation through the trees' leaves reduces water vapour

in the atmosphere and prompts a drying of the climate to such a degree that rainfall can virtually cease. The end result of these different factors is desert. When this happens, those responsible move on and repeat the process elsewhere.

The environmental consequences of this destruction are immense but it is encouraged by political and social events. It is not only multinational beef and fodder companies that are responsible but the inequality in some countries. In Brazil, most of the fertile land is in the hands of a small class of rich landowners who cultivate a comparatively small area of their land. Consequently, poor farmers, with little knowledge of soil conservation, are forced to make their living by farming marginal soils and this further depletes the soil.

the most effective way of slowing down soil degradation and desertification is to reduce overgrazing

When drought strikes and crops fail, as in the appalling Ethiopian famines of the early 1980s, there is enormous sympathy in the affluent world. Few are aware – or are made aware – that their dietary practices play a part.

The Sahel region, of which Ethiopia is part, has suffered greatly from overgrazing by cattle. Herd sizes were increased dramatically when deadly sleeping sickness disease (trypanosomiasis) was chemically controlled and far more cattle were grazed than the land could sustain and the resulting land degradation resulted in famine.

When the images of human suffering were shown daily on TV the disaster was presented as an act of nature – it wasn't! Most Sahel countries, including Ethiopia, reported an increase in exports of agricultural products – meat and fodder – during these desperate times. There was no shortage of food but it was the wrong kind. The reasons for the famine were political and economic and they usually are and are repeated all over the third world – hard currency earnings from the export of meat and fodder given preference over food for local consumption.

The main grazing animals across the world are increasingly cattle in order to fuel the hamburger culture and in an attempt to ape the West – West is best! However, as land degenerates and becomes unsuitable for cattle, goats and sheep are increasingly being grazed on the most marginal land and their appetite for almost any vegetation ensures virtually complete destruction. It really is the *coup de grace*.

The most effective way of slowing down soil degradation and desertification is to reduce overgrazing, deforestation and intensive agriculture. The only way to do that immediately and effectively is for people to change their diet – go vegan. There really is no other solution.

ANTIBIOTIC POLLUTION

In 1968, after serious outbreaks of drug-resistant salmonella were linked to the use of antibiotics in livestock, the Swann Committee was set up. Its remit was to consider the dangers of drug resistance in animals given antibiotics and the risks this posed to human health. It advocated seriously restricting the use of antibiotics that were used by both animals and humans.

By the time the report was published it had been considerably watered down and after enormous lobbying by the industry, the government retreated even further from Swann's recommendations and the use of antibiotics in farming rapidly expanded, including the use of drugs used by both humans and animals. Which is one reason why we have arrived where we have, with superbugs regularly dominating the headlines and human life seriously threatened.

There is a growing awareness of antibiotic resistant bacteria and superbugs in the public at large but if media reports are anything to go by, most believe the problem stems from the over-prescribing of antibiotics by doctors. The global use in livestock farming for treating diseases (therapeutic), preventing diseases (prophylactic) and simply to make animals grow faster (growth promoting) is rarely mentioned.

Despite an EU-wide ban on growth-promoting antibiotics added to animal feed from1 January 2006, similar quantities of antibiotics are now given for 'disease prevention' (resulting in the desired growth promotion)! In the UK, these prescription-only antibiotics are even advertised to livestock farmers for their growth-promoting properties in defiance of an EU Directive seeking to end this practice!

There are detailed reports on why antibiotic use in farmed animals is causing a threat to human health (for example see Richard Young's *The Use and Misuse of Antibiotics in UK Agriculture* parts 1 to 4 from www.soilassociation.org). Farm use of antibiotics have caused antibiotic resistance to medical drugs in several types of food poisoning (eg *salmonella, campylobacter* and *E coli*) and drugs of last resort for

treating strains of the hospital superbug, vancomycin-resistant Enterococci (VRE), which infects wounds and incisions.

Resistance in food poisoning bacteria has come about mainly from using antibiotics routinely to prevent disease. In the case of VRE, resistance came from using growth-promoting antibiotics in farmed animals.

In simple terms, antibiotics have been massively overused by farmers in intensive farms to make the animals grow quickly and 'efficiently' and to attempt to stop the rapid spread of disease in conditions that bacteria are able to spread like wildfire. This overuse has led to bacteria becoming resistant to the drugs so that when the same drugs are used to treat humans, they no longer work.

The issuing of reports has continued and so has the ignoring of them, such is the power of the livestock lobby.

antibiotics have been massively overused by farmers in intensive farms to make the animals grow quickly and 'efficiently'

In 1997, the World Health Organisation (WHO) issued a report calling for a restriction in the use of antibiotics in farmed animals. In 1998 the National Research Council & Institute of Medicine was even stronger in its condemnation. In 1999, the UK government's own Advisory Committee on the Microbiological Safety of Food also issued a massive report and agreed with the WHO. Also in 1998, the Soil Association, which represents organic farmers in the UK, issued its own damning report (followed by three more).

Despite this extraordinary amount of scientific interest and a plethora of recommendations advocating restraint, restriction and a rethink, the drugs have kept flowing and the scale of antibiotic resistance has grown. Weakness, cowardice or self interest has prevented consecutive governments from taking the action necessary to protect human life.

The British Medical Association summed up what many people now believe when its former chairman, Sandy Macara, stated: "There is a real prospect that the majority of our antibiotics could become impotent for the purposes upon which we have relied upon them for 40 years." This would transform society, essentially taking us back to pre war days when infectious diseases were prevalent. It would also place an extremely high risk on invasive surgery such as hip replacements.

One of the arguments of the farming lobby to justify 'business as usual' has been that there is no proof positive that antibiotics used in animals have played any part in producing the resistant strains that now threaten humans. Of course, the claim beggars belief but all those reporting independently on the subject are convinced there is a strong link but admit that providing proof strong enough to satisfy the empirical standard of experimental biology is difficult.

However, a team of researchers reporting in the journal *PLoS Medicine* in 2007 found that animal agriculture

not only plays a part in the problem but constitutes an even more important source of these deadly mutations than medical prescribing.

Antibiotics and resistant bacteria are found in the air and soil around farms, in surface and ground water and in wild animal populations and on much of the meat produced by these places. Those handling and using meat face high exposure to the bacteria but researchers concede that infection is likely to be slow, hard to trace and equally hard to prove.

Despite this, the researchers were satisfied that transmission of the bugs from agriculture had a greater impact on humans than over-prescribing. When Denmark banned growth promoting antibiotics there was a drop in the prevalence of resistant bacteria in farmed animals, around farms, on meat and in people. So both the source and the remedy seem pretty clear.

Despite this, it is difficult to discover accurate figures on the amounts of animal antibiotics used in the UK (see below for published figures), the types of animals treated and the number and why they are used.

Farmers have a statutory obligation to keep a record of all antibiotic use in treatment books but a government committee in 1999 found that 50 per cent had no book, 25 per cent had a book but it was not used or was out of date and only 25 per cent had up-to-date records. Of course, what record keeping does exist is entirely in the hands of the farmer so there was no way of telling how accurate even the up-to-date books were. The reason for using eight-year old statistics is that any information on antibiotic use is hard to come by.

The government will naturally boast that it has transformed the use of antibiotics by banning some and encouraging alternatives. The evidence is that when one growth promoting antibiotic is banned the use of others simply increases (see below).

Across the third world, of course, where intensive animal farming is exploding fastest, there are no bureaucratic requirements or controls at all and so antibiotic use is even more unregulated than it is in the UK. One of the biggest problems in creating antibiotic resistant bacteria is under-dosing so that bacterial infections are not entirely wiped out and those remaining are the most resistant, which then go on to reproduce and recolonise. With antibiotics being expensive commodities, there is always a financial incentive to undertreat, particularly in comparatively poor countries.

> there is a real prospect that the majority of our antibiotics could become impotent

In most intensive farming, antibiotics are administered through food – a very much hit and miss affair. This was half-heartedly controlled by banning some medicated feed but farmers were still allowed to sprinkle antibiotics on top of the feed in troughs so long as they registered and kept records. The Soil Association estimates that 10,000 farms may have failed to register and are ‘top dressing’ illegally.

Some figures are available from the US, which produces 22.7 million kg of antibiotics annually and a half is used in livestock farming. Of this, 80 per cent is for growth promotion by controlling bacteria in the intestines of animals and improving their feed conversion rate.

Much of this passes through the animals and finds its way into the environment as residues. Through a process that no one fully understands but includes the passing of genetic material from one bacterium to another, antibiotic-resistant strains can pass on their resistance to other, unrelated bacteria. Benign bacteria can pass resistance to pathogenic (disease causing) bacteria and those with this resistance out-compete and propagate faster than those without it. No wonder the UN FAO refers to this as a 'source of considerable environmental concern'.

A frightening example of a superbug from farmed animals transferring to humans is happening in the Netherlands now. The superbug methicillin-resistant *Staphylococcus aureus* (MRSA) is already a high-profile, persistent problem in many UK hospitals. Now a new strain of MRSA (identified in 2004) has developed amongst intensively farmed pigs, chickens and other livestock on the Continent. MRSA in farmed animals has already transferred to farmers, farm-workers and their families in the Netherlands, causing serious health impacts. Forty per cent of Dutch pigs and 50 per cent of pig farmers have been found to carry farm-animal MRSA (Soil Association, 2007). In the Netherlands, MRSA has been found in 20 per cent of pork, 21 per cent of chicken and 3 per cent of beef on sale to the public. Dutch scientists and government officials blame this new strain of MRSA in farmed animals on the high levels of antibiotics used in intensive livestock farming (Soil Association, 2007).

The UK government has committed itself to reducing the amount of antibiotics used in UK farming, yet overall levels remain high. Despite an EU-wide ban on growth-promoting antibiotics added to animal feed, similar quantities of antibiotics are simply being prescribed by vets for disease prevention (Soil Association). Veterinary use of antibiotics used for therapy or disease prevention in UK farmed animals has increased by 3.5 per cent, from 405 tonnes in 1999 to 419 tonnes in 2005, despite a fall in overall livestock numbers. In the UK, over 90 per cent of veterinary antibiotics are used in pig or poultry production (Goodyear 2006).

Although currently banned in Europe, there is widespread use of hormones in animal agriculture in the US and some other countries. As with drugs, they readily find their way into the environment and as with antibiotic resistance, it is difficult to prove beyond doubt that they damage the environment.

However, the UN FAO feels that because they can affect the endocrine system (a series of glands throughout the body that cover such things as growth, including sexual organs) this would account for dramatic changes that have been seen in wildlife – changes in rates of growth, cases of feminisation or masculinisation of fish and the increased rates of breast and testicular cancer and changes in the male genital tracts of mammals. This, of course, includes humans!

There are other substances used in animal farming that pollute the environment, including detergents, disinfectants, heavy metals, pesticides and fertilisers.

CHEMICAL POLLUTION

There are a huge number of pollutants resulting not just from rearing and feeding animals but from processing them, too. Livestock excreta contains a considerable amount of nitrogen, phosphorous, potassium, drug residues, heavy metals and pathogens (disease causing bacteria) and these pose serious threats to the environment. In 2004, it is estimated that 135 million tonnes of nitrogen and 58 million tons of phosphorous were produced from manure – cattle accounting for 58 per cent, pigs around 32 per cent and poultry seven per cent. To this has to be added the vast amounts of nitrogen used as chemical fertiliser on fodder crops.

Of these nutrients the most pressing concern is over nitrogen which, although a nutrient essential to all forms of life, is one you can have too much of. Nitrogen has to be 'fixed' – changed into a form available to plants by bacteria and blue-green algae (more recently renamed cyanobacteria) – and under natural circumstances it is quite limited, a precious commodity.

All that has changed in the past few decades. Driven by a massive increase in the use of nitrogen fertiliser primarily for animal feed, the burning of fossil fuels and large scale clearing of forests, the amount of nitrogen available has doubled sine the 1940s. We now have the extraordinary situation where human-produced nitrogen is estimated at 210 million tonnes, greater than the world's natural supply.

The threat of nitrogen overload was once concentrated in Western countries but is becoming a global threat with the spread of animal agriculture. Excess nitrogen can seriously damage the environment with just a few

species of grass dominating and heathland, rich in species, giving way to conifer forests which host few species. It also poses a serious threat to human health and is linked to blue baby syndrome, a potentially fatal destruction of red blood cells in new-born children.

The gases nitrogen produces – nitric oxide and nitrous oxide – play a major role in causing smog, ozone depletion, global warming and acid rain – and they can claim 65 per cent of the blame for the latter.

Some of the greatest damage is done to waterways because of nitrogen run off. One half of all the commercial fertiliser ever produced has been applied since 1984. Only 50 per cent is taken up by vegetation, the other 50 per cent evaporating or being washed into groundwater or watercourses as run-off. It is joined by run-off from manure, both from grazing animals directly or when it used as manure. This poses one of the greatest threats to the aquatic environment.

Just as nitrogen fertilises the land so it fertilises water plant growth and algae, which can grow almost uncontrollably. When this vegetation dies and decays it can rob the water of oxygen, essentially suffocating fish and other aquatic organisms. It is a process known as eutrophication and isn't confined to inland waterways but seriously damages estuaries and inshore waters too, where most fish and shellfish breed.

Partly enclosed seas such as the Baltic Sea, Black Sea and Mediterranean have been hit hard by eutrophication and a dead zone has developed in the Gulf of Mexico off the mouth of the Mississippi River. In fact, 150 of these dead zones have been identified – and there may well be more – some the size of small countries. The United Nations Environment Programme (UNEP) believes they will soon damage fishstocks even more than overfishing.

Also increasing are the number of toxic algal blooms covering vast areas of seas and inland waterways and are a threat to human and other lives.

It beggars belief that the world is still anticipating rapid growth in livestock and fodder production when even the present levels are wreaking havoc on a scale that is entirely new to the planet and entirely unsustainable.

Manure poses other threats and is present in great quantity. It is estimated that the US cattle herd alone produces 253,924 pounds of manure a second. Worldwide, livestock produce in excess of 13 billion tonnes of excreta a year. Apart from its threat to the environment, more than 40 diseases can be caught by humans from manure.

HEAVY METAL POLLUTION

Heavy metals are fed to livestock at low concentrations to counter health problems or to act as growth promoters. They include copper, zinc, selenium, cobalt, arsenic, iron and manganese. Animals can absorb only 5 to 15 per cent of the metals they ingest and the remainder is excreted into the environment.

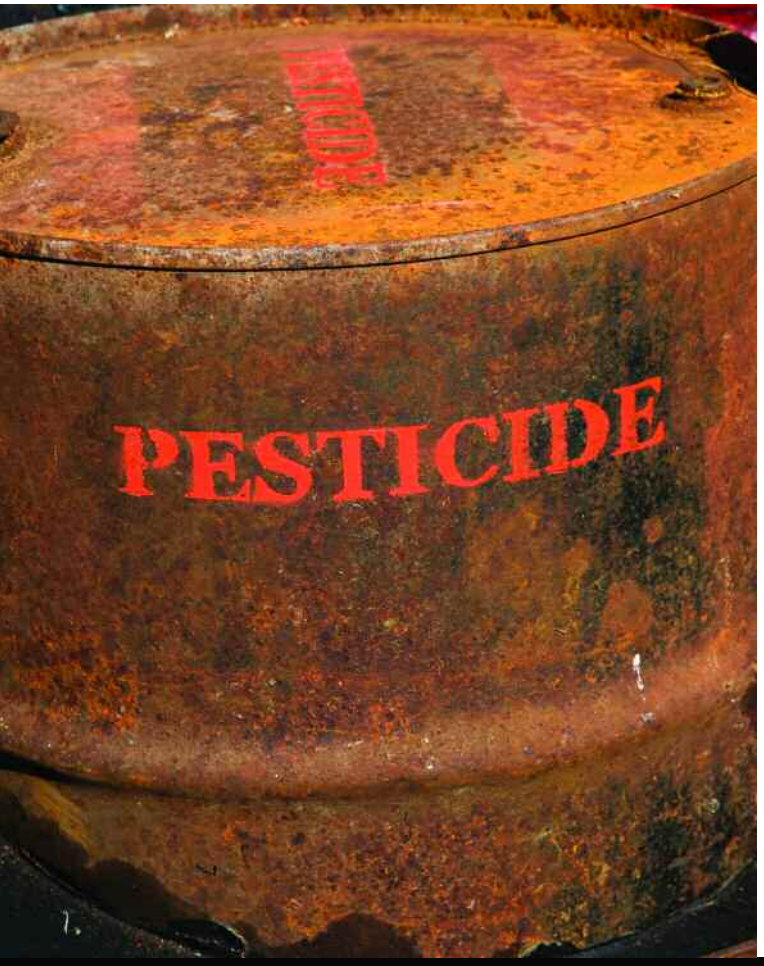
PESTICIDE POLLUTION

It is the enormous demand for fodder which spurs most pesticide use. Without intensive agriculture and the lavish application of both fertilisers and pesticides, including fungicides and herbicides, crop yields would be insufficient to provide the volume of fodder required. Ironically, this very process of dousing the land with chemicals is destroying its fertility and contributing to land degeneration, effectively reducing the amount of land available. It is a self-defeating policy that appears to concern few in government or agriculture.

Pesticides are central to modern intensive agriculture and their pervasive nature was first highlighted by DDT which was found to have spread to almost every area of the Earth. The list of substances currently known to contain a potential threat to human health has grown dramatically. Residues are found in virtually every piece of meat eaten.

While usage has decreased slightly in the EU, several hundred different pesticides are currently used in agriculture around the world. The two most important are organochlorine and organophosphorous compounds. They can contaminate soil, water and air, affect non-target creatures and damage the proper functioning of ecosystems.

There is a wonderful little word called biomagnification which describes how pesticide residues concentrate the further up the food chain you go, resulting in huge concentrations in top predators and humans.



Pesticides can impact on the health of all animals and plants and can cause cancers, tumours and lesions, disrupt the immune and endocrine systems, affect reproduction and result in birth defects. In practice, the whole food chain can be affected. Agent orange, the defoliant that has devastated Vietnam, producing monstrous diseases and birth defects, was a dioxin-based herbicide.

A recent study based in Germany found that areas near to farms using pesticides show up to six times less biodiversity than habitats surrounding organic farmland. Research also shows that reductions in pesticide use can lead directly to the regeneration of failing wildlife populations.

What amounts to almost unbridled chemical warfare has led to 4.5 billion litres of pesticides being sprayed on to UK land every year. Water companies spend £120 million annually trying to remove pesticides from our water.

BIRD FLU

What is perceived as one of the greatest potential threats to human health has spurred the World Health Organisation (WHO) and health services everywhere into action, stockpiling vaccines that may not work and preparing for mass sickness and death on a devastating scale. Bird flu – avian influenza – is the reason. This threat, either real or imagined, joins other existing and future novel diseases which will inevitably develop and infect humans. It is another gift from intensive livestock production.

Bird flu is an infectious disease of birds caused by type A strains of the influenza virus. Discovered more than 100 years ago, there are now at least 144 different strains worldwide. Some circulate in wild birds and cause little or no illness while others are highly infectious, causing many deaths in domestic poultry but are rare in wild birds.

Once introduced to domestic poultry flocks, some low pathogenic (disease causing) forms (H5 and H7 strains) can mutate or change within a few months into highly pathogenic forms and this is how the current H5N1 virus originated. In other words, a relatively harmless virus in wild birds infected farmed poultry and changed itself into a more deadly bug. This bug – H5N1 – was then transmitted back to wild birds and is highly deadly in them too. Without farmed poultry, H5N1 would most likely not exist.

Farmed birds have been selectively bred for increased meat and egg production at the expense of weakened immune systems and an increased susceptibility to disease. The dramatic growth of farmed poultry over recent years has inevitably led to intensive production worldwide, allowing viruses to spread and mutate rapidly.

The virus is both airborne and transmitted through infected faecal, nasal and eye discharges. The deadly H5N1 strain can survive for long periods in the environment, especially in low temperatures – 30 days at 0°C . This allows the disease to spread from flock to flock through live poultry markets and contaminated farm equipment and from region to region through the international trade in live poultry and through infected migratory birds.

The 2007 outbreak of bird flu at a Bernard Matthews' turkey farm in Suffolk following a similar outbreak at Bernard Matthews's plant in Hungary, seems to illustrate this. The fact that the government chose not to make this connection caused incredulity and is another indication of its special relationship with livestock farmers.

H5N1 has so far been found in wild or domestic birds in a large number of countries, many of which are major poultry exporters, with China and Thailand accounting for 15 per cent of global poultry shipments. In 2002, the EU imported 175,000 tonnes of poultry from these two countries and the UK continues to import up to 200 million chickens a year, despite the onward march of the H5N1 virus.

Dr Perry Kendall, chief medical officer for British Columbia, Canada, said that the province's bird flu outbreak in 2004 showed that the chickens kept indoors were more vulnerable than those kept outside:

"The intensely farmed birds tend to be very genetically similar. The methods of farming result in them being actually more frail and more vulnerable to diseases, particularly since there are so many of them in such a small volume of space." He added, "Penning chickens indoors won't necessarily shelter them from avian flu viruses. Farm staff can tramp virus-laced bird droppings into a chicken house on their boots. Tractors can move viruses from farm to farm. Indoor poultry operations only keep birds safe from disease if stringent biosecurity standards are maintained." Experience has shown that stringent biosecurity measures are rarely taken on poultry farms.

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The current situation is that humans have caught H5N1 bird flu directly from poultry but there has been no proved transmission from human to human. That will require a further mutation of the virus, which most scientists believe is only a question of time. It follows that the more frequently people are subjected to the existing virus, the greater its opportunities to mutate.

Bird flu virus can survive for long periods in body tissue and inside and on the surface of eggs laid by infected birds. Consumption of any raw poultry products, including meat, blood and eggs, from infected birds are therefore a potential risk. As the virus is heat sensitive, being inactivated by a temperature of 60°C in 30 minutes, well-cooked poultry meat and eggs should theoretically be free of the virus. However, the same applies to *Salmonella* and *Campylobacter* food poisoning bacteria and yet millions of people in the UK are infected by them every year from handling and eating poultry.

HEALTH

The devastating effect that livestock have on the environment is matched by the impact they have on human health through their meat and milk. These foods are the principal causes of degenerative diseases – the diseases of affluence that devastate the health of people in the West and eventually kill most of them. Heart disease, strokes, some cancers, obesity and so on.

Public health policy has been an abject failure in dealing with these degenerative diseases, most of which are now at epidemic proportions and increasing remorselessly. Cancer and heart disease affect one in three, diabetes is set to double in a decade and obesity is out of control. The number of people suffering from these and other long-term chronic – and largely avoidable – conditions is so great that the National Health Service is groaning under their weight and cannot cope. It is being destroyed by the demands of diseases that are largely preventable. The only reason people are living a bit longer is because of mass medication, better surgical procedures and earlier diagnosis but they are anything but healthier.

I mention it in this report because the vested interests which have undermined the science on health are often the same as those undermining action on environmental issues and for the same reasons. Governments' complicity in both these events is shameful. Demolishing the myth that meat and dairy are healthy and essential components of the diet is a vital element in saving the global environment.

The UN FAO's report marks a scientific watershed in acknowledging livestock's destructive effect on the global environment. An equally important watershed in understanding human health was reached in 1990 when the World Health Organisation (WHO) published its report *Diet, Nutrition and the Prevention of Chronic Diseases*. It could not have been more forthright:

> *"Coronary heart disease, strokes, various cancers, diabetes mellitus, gastrointestinal disorders and various bone and joint diseases – although a large number of dietary factors have been investigated, those most frequently linked to such diseases are embodied in the so-called 'affluent' diet, a pattern of eating typified by high consumption of energy-dense foods of animal origin and foods processed or prepared with added fat, sugar and salt."*

In the same year, the first results of the China Study were released – a collaboration between Cornell and Oxford Universities and the Chinese Department of Health on the biggest epidemiological study ever

undertaken. It began with the health records of 800,000 people and the in-depth study of 6,500 of them. The data are still being interpreted but the findings are crystal clear – animal products are the root cause of degenerative diseases and that animal protein (in lean meat) is even more damaging to human health than saturated fat and central to raised cholesterol levels. Work by the lead researcher, Professor T Colin Campbell, found that animal protein (from cows' milk) could switch cancer cells on while vegetable protein could switch them off even after they had started to grow.

Almost none of the findings from these two important studies – and the mountain of other research that has accumulated since – have been translated into public health policy. The advice for heart disease sufferers is to swap fatty meat for lean meat and butter for margarine, exercise and have five portions of fruit and veg a day – a policy that reduces cholesterol levels by only five per cent, leaving most sufferers still in the risk zone for a heart attack.

Changing to a plant-based diet can not only remove people from risk but can also repair the arterial damage caused by cholesterol even in advanced cases – it can reverse heart disease. Patients are not even offered this option.

The most glaring example of the 'protected status' afforded to animal products is the attitude to milk and dairy. No wide-ranging review of the science on dairy and health had ever been undertaken until the report *White Lies* was published by our sister organisation, the Vegetarian & Vegan Foundation, in 2006. Dairy has consistently been promoted as an essential food stuff when the science shows it to be possibly even more damaging to health than meat.

One of the main selling points for milk is its calcium content – essential to equip us and our children with healthy bones, we are told repeatedly. What we aren't told is the fact that the countries where people drink the most milk have the highest rates of osteoporosis. The 70 per cent plus of the world's population which doesn't touch milk and dairy tends to suffer little from osteoporosis!

The process through which milk can reduce calcium stores is not mysterious and is well documented. The digestion of animal protein causes an acid overload which the body neutralises by leaching calcium from the bones. It is described by the WHO as the calcium paradox.

So how has the damage done to human health by animals been glossed over so successfully? In precisely the same way that their damage to the environment has been glossed over – political short-termism, a fear of adopting politically unpopular policies, a commitment to a philosophy of increasing consumption, indolence and above all, an unhealthy closeness to the industries which benefit hugely from both calamities.

The entire NHS budget, minus a couple of per cent or so, is dedicated to controlling diseases not to preventing them. The giant pharmaceutical companies are the main beneficiaries, supplying around 18,000 different pills and potions for diseases that could be mostly controlled by less than 300 medications, according to the WHO. In fact, this vast budget cures very little.

Similar priorities are reflected by the big health charities working on heart, cancer, Alzheimer's and other diseases. A tiny fraction of their budget goes on prevention and is obscured entirely by their obsession with finding elusive cures. They offer almost no dietary advice that accurately reflects the scientific research and would

help people avoid the disease in the first place. The quest for a golden bullet – and the availability of funds to help them do it – has grossly limited their effectiveness which is why rates of disease increase remorselessly.

If they do find a cure, of course, fortunes stand to be made and again this perfectly matches the priorities of the pharmaceutical industry. It also means that people can continue to indulge themselves in the wrong foods and destroy the environment. God forbid that personal and communal responsibility should ever be encouraged because it is clearly bad for profits!

The government's attitude to heart health is a pretty good indicator of their priorities. The WHO spelt out the position in 1990. "… the entire population of most affluent countries shows a high risk profile and intervention on a mass scale is needed." The WHO made it clear that the only effective intervention was through diet.

In 2007 the UK government announced its idea of mass intervention – taking statin drugs off prescription and making them available to everyone. What an admission of failure, except of course for the pharmaceutical companies who must have been turning cartwheels of joy that their $600 billion joint turnover was about to be boosted even more.

In fact, this breathtaking figure has been built on the back of human and animal suffering and destruction of the environment. If the apocalypse really does have horsemen they will almost certainly be emblazoned with names of the big pharmaceutical companies.

These are, of course, the same people who have poured billions into developing genetically modified organisms (GMOs) and it is no coincidence that at the head of their production list are fodder crops – wheat, maize, soya and oil seed rape amongst them.

Environmental campaigners have brilliantly held back this invasion of these new species in Europe for the time being. Their fears that they will spread pesticide resistance to other plants, wipe out insects and other creatures and destroy organic farming are all valid. What none of these organisations has done is to identify why GMOs are needed in the first place. Without that vital understanding the battle will eventually be lost.

GMOs are required to maximise fodder production in order to spread the factory farming of animals around the globe. This is where the battle lines are drawn. The few who understand the devastation caused by mass animal farming and want to stop it are pitted against the world's biggest and most ruthless companies who cannot survive unless it continues. This is not a battle of equals and unless it is won by David, Goliath is likely to destroy the global environment and possibly us with it.

Sceptics always respond that multinational CEOs have children too and wouldn't do anything so stupid but sadly that isn't the case. These are not corner shops but massive global institutions and those who direct them are riding a tiger and should they hesitate in their drive to maximise profits it will devour them.

If the CEO of, say, Monsanto persuaded his board of directors to stop producing antibiotics for animals because of their dangers every other pharmaceutical company would remain silent. They would wait for the profits to

collapse and the share price to drop and then step in with a buy out. This is how global capitalism works, like a bunch of kids dashing towards a cliff edge in a global game of chicken.

Intensive livestock farming accounts for perhaps 40 per cent of their income. Only by dosing billions of animals with a cocktail of drugs, antibiotics, growth enhancers and pesticides can the barbaric systems work. This has created a separate problem of antibiotics resistance and superbugs (see pages 43-46).

To produce sufficient fodder to feed this mass of animals, yet more intensive agriculture is needed – land pushed beyond its limits with artificial fertilisers, pesticides and hundreds of highly-priced chemicals, many of them carcinogenic.

An equally important profit centre comes from pretending to cure the human diseases caused by eating animals. It is a blinding marketing success – a wonderful, gigantic, circular scam. To destroy this golden goose is to destroy themselves.

They have no intention of doing that and, like the tobacco industry, their profitability is dependent upon expanding their trade into the developing world. Even with the destruction of forests and other ecosystems, there is not sufficient land to grow the huge volume of fodder needed. The amount of productive land is diminishing through desertification and soil degradation and will diminish further still with flooding resulting from global warming.

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The driving need, therefore, is to make maximum use of existing land by destroying all weeds and wild plants which compete for nutrients and water and to increase crop yields – hence genetic modification. And to take control of agricultural land wherever possible. Invariably, it will be the poorest whose land is expropriated and Brazil is a good example of what is happening. It is a country riven with landlessness and hunger yet one crop accounts for 25 per cent of its agriculture – soya beans for animal feed.

All across the world, peasants are being pushed off the best land to eke out an existence on the margins, where their animals destroy the fragile environment. They then move on and cause more destruction.

The WHO report also addressed this and made an impassioned call for an end to the dominance of meat. "Policies should be geared to promoting the growing of plant foods and to limiting the promotion of meat and dairy." It was, it said, cheaper, healthier, more efficient and the only way to feed the world.

So far almost no one has listened to them.

Viva!

Belatedly, the world has started to focus on the environment and talk of global warming is everywhere, if not action. All the world's other pressing environmental problems are largely ignored – deforestation, desertification, pollution, loss of soil fertility and biodiversity, overfishing and overuse of fresh water amongst them. Central to all these problems, including climate change, is our diet. Eating meat, dairy and fish is literally destroying the Earth. This report makes clear how little time is left for action and how simple that action can be.

Viva!

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Change your Diet – Change the World