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Sustainable Development

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February 2005

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Formally a Ward Sister in Edinburgh, Sara Parkin has contributed to the development of Green Parties world wide, playing various roles that include leading the UK Green Party and the European Greens.

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FORUM FOR THE FUTURE

Forum for the Future is recognised as the UK's leading sustainable development charity. Its object is to promote sustainable development and to educate different groups in sustainable development, in order to accelerate the building of a sustainable way of life, taking a positive solutions-oriented approach.

It was founded in 1996 by environmentalists Jonathon Porritt, Sara Parkin and Paul Ekins out of a conviction that many of the solutions needed to defuse the environmental crisis and build a more sustainable society are already to hand.

http://www.forumforthefuture.org.uk/

ACKNOWLEDGEMENTS

With many thanks to Victoria Christison and Alex Pertusa for editorial and research support.

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INTRODUCTION

A reflection.

There are any number of catalogues of reasons as to why taking sustainable development seriously is important.

Some are powerfully presented by charities and voluntary organisations that have worked in various specialist fields for decades. Organisations like WWF, Amnesty International, Save the Children, and Church Action on Poverty highlight the results of *un*sustainable development be it manifest in human or environmental degradation (see e.g. Christie and Warburton, 2001). Other evidence has been presented by governmental bodies and prestigious institutes that range from the UN Panel on Climate Change, to the House of Lords select committees, to the American Academy of Science, to the Meteorological Office. With varying degrees of scientific precision, they all try to bring together current knowledge of a global picture that is clear enough to guide policy at all levels.

As individuals, we read regularly about hectares of rainforest lost; numbers of species extinct in our lifetime; tonnes of carbon emitted per capita; life expectancy at birth; number of people without access to the internet, telephones, jobs, homes, food, basic human rights. Some of the figures, on the surface at least, seem to paint an easy to understand picture, like, for example, a country's life expectancy at birth. Yet the published figure can hide much deeper problems. An average life expectancy at birth of 60 years, for example, masks the fact that the majority of people live *less long* than the average. Moreover, within the country average there may be regional disparities due to any number of causes - e.g. disease, starvation, war or massacre.

But what does the loss of 200, 2000 or 20,000 hectares of rainforest mean? Even when expressed in multiples of football pitches, probably only experts in rainforest ecology can properly comprehend statistics like this. What do they all add up to? Is, for example, the loss of rainforest in Brazil and Peru connected to economic failure or success? Is there a link between human rights and the huge drop in fish catches in many of the key fishing areas of the world? How will we know when we have reached the limits? How will we know when the next trawler load of fish, or the next mangrove swamp clearance will deplete fish stocks or breeding grounds beyond recovery? Or when the next tonne of CO2 emitted is the one tonne too far – the one that makes it impossible for the global ecological systems to regain their control? And, much nearer to home, where do I fit in to all this? What can I do in my small sphere of influence at home or at work that will make any difference one way or another?

The path to *sustainability* is crowded with questions like this. And working out the answers and putting them into action is what *sustainable development* is all about - the act of adopting a path for human progress that is sustainable i.e. it has the capacity to continue into the long term future.

This paper doesn't attempt to answer all these questions directly. Rather it will try to provide the reader with a basic 'primer' about sustainability; what it is and why it matters. It will also offer an introduction to a single, portable, easy-to-use, conceptually robust way to think about what the key sustainability questions might be in the first place. What it will try to explore is an intellectual framework to help make sense of the world, whether those questions are posed at the level of the earth's ecological systems, a country, a local authority, a business, a university, a corner shop or a household.

Critically, the same framework (dubbed sustainable capitalism for reasons that will be explained) must have an intensely practical application. It must provide not only a logic within which we might make sense of what to do next, but also the means to design immediately implemental action plans that give a reasonable degree of confidence that we are on the right track. It is 225 years since the Enlightenment and the Industrial Revolution and it is their intellectual legacy that we are playing out. The evidence of escalating environmental degradation, persistent poverty and widening inequality of opportunity of every sort means we ought to be rectifying the errors our evolutionary strategy made then (ignoring the laws of the biological world as we developed our economic one) with no time wasted.

And no less ambitiously, through thinking about what we do to the natural world and to each other in this way, we might even come to remember that the purpose of life might be something more mind and soul nourishing than growing GDP year on year.

1. THE PURPOSE OF LIFE

The idea that the purpose of life is happiness is not new. Biologists might put survival and sex first, but human happiness is surely inclusive of these primary evolutionary instincts. The human brain is huge, bigger than needed to just survive and reproduce, and costs us 20% of our metabolic energy in maintenance. One explanation for this mental capacity (the brain remains the most powerful non-linear computer there is!) is that we have evolved with finely honed social skills which are remarkably complex and have pleasures and happiness beyond survival and sex as their purpose (Ridley, 1996; Tudge, 2000). It could even be argued that survival and successful sex (including rearing children to adulthood) in the human species depends on adeptness at social relationships. In the 18th century, Utilitarian philosopher Jeremy Bentham, proposed that pursuit of individual happiness should be the object of public policy.

Unfortunately, in the European 'Enlightenment' struggle taking place at that time (to secularise morality in order to make Man's rationality rather than that of the Church the legitimate decision-making system for political and social leaders), finer sensibilities - including morality and happiness - lost out. The intellectual and political rush to find a logical system that could pursue the greatest happiness of the greatest number left by the wayside the various higher values and virtues that had acted as either guide or governor (and which largely predate the birth of modern religions) on human behaviour. More social and ineffable ideas of what constitutes happiness got lost in the practicalities of defining self-interest. A circular assumption developed: if people consumed goods and services, *ergo* it was because they derived pleasure

and happiness from them. So the very act of consumption became a surrogate measure for happiness, and is now the central organising premise of modern economics. Moreover, the failure of economics to cope with the complex, *uncountable*, aspects of the human condition has been turned into a virtue. The value-free or 'a-moral' nature of the now globally operating free-market economic system of the 21st century is vaunted as one of its most important attributes.

Down the years, however, there have been many who have tried to counter or temper this logic, and we can only skim the surface here. Harvard philosopher Hilary Putnam, for example, argues that value judgements can be rationally supported, and rejects the idea that values are not part of the "furniture of the world" (Putnam, 1981). Ethics and values may be approached from many different directions: from the perspective of human needs (Max Neef); a desire for spiritual meaning (Armstrong, 1993); human psychology (Kohlberg, 1981) or anthropology[i]; or even by returning to the Greek philosophers. And, although there may be differences between cultures and over time, there do seem to be universal strands that can be traced over geography and time. Alasdair MacIntyre, for example, has argued that the Enlightenment's central objective of placing at the centre of state power citizens and politicians rather than God and his earthly representatives, failed precisely because virtues and morals were sidelined as economics took over from moral philosophy as the flagship discipline to steer modernity (Macintyre, 1981).

Some, reading this, may baulk at the lack of more detailed reference to cultures with different intellectual and spiritual heritages or perspectives. But space, plus the observation that it is the Western version of modernity, mainly in its leadership and style, that now dominates the world, are the reasons why other perspectives are more implicit than explicit. There are no states using Buddhist economics in the OECD, for example, nor is NATO famous for its interest in Gandhian methods of non-violent conflict resolution. Besides, the purpose is not to blame, but to understand enough to change what we do – and change fast. Time spent grinding axes is time wasted.

Moving quickly is important right now. In the light of the apparent victory of the 'Moral Majority' in the November 2004 US Presidential elections, some may feel that morality is right back up there as an equal partner with economics. And that, therefore, the ultimately unsuccessful Enlightenment project of uniting economic and moral objectives in the hands of rational people instead of church dogma is back on track. But it would be wrong to assume this to be the case. Defending the role of reason and argument in ethics, Princeton philosopher Peter Singer has carried out a clinical dissection of the moral philosophy of George Bush, and failed to find a consistent definition of right and wrong or good and evil in the President's utterances and actions, nor a consistency of either with human rights, Utilitarianism, or even Christianity. Moreover, Singer could not identify a consistency in the way Bush uses his famous instinct, what he calls his "gut feeling". This seems to imply that the President of the Earth's only super state operates with no personal set of guiding or governing values of any kind (Singer, 2004).

This is rather a nerve-wracking conclusion. On the one hand the majority of the US electorate have the false impression that their President is a "highly admirable person of enormous personal decency … a godly man and a moral leader"[ii] when his

actions reveal him as a most obedient servant of a-moral post-Enlightenment economics. On the other more positive hand, there is still a vacancy for a logic within which to tackle the challenges of the 21st century, and perhaps therefore an opportunity to pick up a neglected strand of thinking from the Enlightenment. One that did not resonate down the centuries, as did the voices of the founder of classical economics Adam Smith and his intellectual progeny, but one which probably holds the best chance of reuniting the disparate economic, social and philosophical ambitions of our species around a common – and higher - purpose. It came from James Hutton.

James Hutton was born in 1723, the same year as Adam Smith, and in 1795 published to great acclaim a geological version of Smith's massively influential *Wealth of Nations*. In *The Theory of the Earth* Hutton observed that "this world has neither beginning nor an end" and described the continual renewal cycles of the natural world as having one purpose – that of life itself. "We are thus led to see a circulation in the matter of this globe, and a system of beautiful economy in the works of nature (Hutton, 1795)." His conclusion, was called "sublime" by commentators at the time, because it represented "nature as having provided for a constant succession of land on the surface of the earth, according to a plan having no termination " (Playfair, 1805). This was a hugely comforting view of the world for those living through what were exciting but often confusing intellectual times as the 19th century dawned. And although we now know that the universe will ultimately decay, the epochal timescales involved do not detract from Hutton's theory. One that was launched 210 years ago.

We can also bring forward an encouraging counterpoint to the subsequent marginalisation of values and ethics from the centre stage of human progress.

A troubling feature of the recent past has been the rise of extremist religious groups. While they may claim to be fundamentalist and are called so by newspapers, they are not so in truth. For example, the suicide hijackers on the murderous planes of 11th September 2001 were known to be heavy drinkers of alcohol and to enjoy women and nightclubs. No devout Muslim would do this (Armstrong, 2000). Nevertheless the rise of fundamentalism, including the unthinking and inaccurately labelled Moral Majority in the USA, does have to be taken seriously. These are most constructively thought of as one (very small) part of a pretty large, possibly global, gasp for a breath of meaning about the purpose of human existence. Of course, when fear, poverty, uncertainty or lack of hope, taint the air of everyday life, questions about the purpose of it are bound to arise. But if the only answer on hand is that provided by the preachers of extreme, simplistic solutions then it is not surprising that meaning is found in them. Even violence and suicide become a positive purpose for the desperate.

There is also other evidence that the currency of a responsible approach to ethics and values is gaining value. To give only a few examples. Philosophy recently topped a UK poll inquiring into what subject people would most like to see added to school curriculum. The fastest growing student group ever in UK universities and colleges is People and Planet[iii], and, though I am going to make critical comments about corporate social responsibility (CSR) later on, [see Chapter 6] the rush of businesses to be seen as virtuous and ethical through their CSR activities is

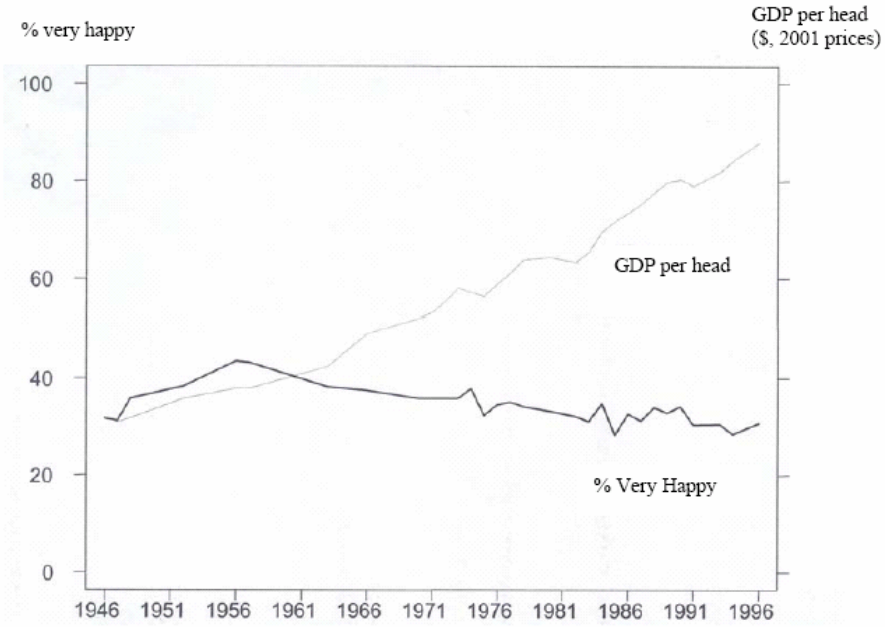
evidence that they recognise that their customers care more about these things than they did in the past.

This sense of collective concern about 'where everything is going' does not have to lead to the nihilism of extremist groups. It can help pose non-hopeless questions about how individuals and groups might engage and contribute to shaping a positive and agreeable future. Again, just one example. Some young UK engineers did just this when considering the challenges of sustainable development for their profession. For them, incorporating ethics and values into their work was a first step: "issues of right and wrong, or good and bad are not, for examples, like preferences for thin as opposed to thick cut marmalade. The difference is that reasons underpin ethics and values, and reasons can be analysed. Ethics and values, therefore, unlike tastes and preferences, are accountable in various ways to reasons, to experience, to strongly held intuitions, and to beliefs."[iv]

To complete our tour of encouraging signs for the future, paradoxically, or rather thankfully, despite the globalisation of the 'classical' theories of economics, there is also a return to a serious appraisal of whether happiness can once again become the legitimate goal of the collective, as well as the individual, human endeavour (see e.g. Easterlin, 2001; Frey and Stutzer, 2002).

Richard Layard, of the London School of Economics, for example, has concluded: "People in the West have got no happier in the last 50 years. They have become much richer, they work much less, they have longer holidays, they travel more, they live longer, and they are healthier, but they are no happier" (Layard, 2005). His evidence includes a time trend study on income and happiness in the USA between 1946 and 1996 (see Figure 1: Income and happiness in the USA).

Figure 1: Income and happiness in the USA



Source: Layard, Richard (2003) *What is Happiness?,* public lecture, London School of Economics, 25 February

Despite a steady rise of GDP per head over the period, the percentage of people saying they are very happy stays pretty flat, only rising with GDP until annual income levels reach $15,000 per capita (in the early 1960s). Layard quotes figures to show Japanese also becoming no happier despite a 6-fold rise in income per head. Even surveys using different language such as 'satisfaction with life' confirm that happiness does not increase over a person's lifespan alongside increases of income. In poor countries, however, there is clear evidence that income does impact on happiness, but once a country reaches income of over $15,000 per head, levels of happiness appear to be independent of income per head.

The clue to protecting happiness as a multi-level goal for humanity lies in the punch-line to Richard Layard's series of lectures. He quotes from a letter Bentham wrote shortly before he died to a friend's daughter: "Create all the happiness you are able to create: remove all the misery you are able to remove. Every day will allow you to add something to the pleasure of others, or to diminish something of their pains. And for every grain of enjoyment you sow in the bosom to another, you shall find a harvest in your own bosom; while every sorrow which you pluck out from your thoughts and feelings of a fellow creature shall be replaced by beautiful peace and job in the sanctuary of your soul." (Quoted in Parekh, 1993[v])

Bentham always did point out that individual happiness could derive from adding to the happiness of *others*, but the idea of making it so central a purpose of life is rather different from how his Utilitarian philosophy was picked up by economists like Adam Smith: "Self-interest was deemed the sole stimulus to human endeavour and the pursuit of happiness an individual's prime concern" (Bannok et al, 1987). Bentham's end of life position also supports the idea that altruism does have a place in economic theory, and that the route to happiness may lie less through exercising personal preferences and tastes than satisfying deeper values and beliefs.

In fact the idea of collaboration and generosity as a route to happiness chimes much more with the evidence from evolutionary biologists and others that the species that collaborate best (amongst themselves and with other species) are those that thrive over time. The more we understand about micro-biology and genetics, the more co-evolution -"an ongoing dance that proceeds through a subtle interplay of competition and cooperation, creation and mutual adaptation" – sounds like the best story of how the human species developed (Capra, 1996).

And it also gives strength to the strongest fundamental message of every spiritual tradition – that the highest level of meaning for an individual is to be found in loving and being loved at every level: as a person, and as a member of different communities – be they spiritual or temporal and including the natural world.

One of the most powerful modern parables is at the end of the film Godfather III. Michael Corleone (the Al Pacino character) is an old man sitting in the beautifully sunny garden of his *palazzo* and reflecting on his life. He is on the edge of death, but does not think of the criminal empire he led for so many years, nor of the successful accrual of wealth and power that was his ultimate purpose. His mind turns over only images of happy times with the three women he loved and lost: his first wife and only daughter who were killed, and his second wife who left him. He dies, not happy but sad.

2. BREAKING THE LAWS

The path of human progress we have taken since the Enlightenment has favoured one type of relationship above all others – that of economic development. Progress is measured not in units of happiness but in terms of 'growth' of the economy, with units of gross domestic (or national) product (GDP or GNP) providing the measure. The 'product' described is the goods and services that are bought and sold in market places around the world. And, although GNP was not intended to take on such an Earthly significant responsibility as a surrogate for human welfare and happiness, it has. Moreover, the models that have been constructed by conventional economics in order to make sense of all the complex activity in an economy have removed what they view as 'inessential' features – including values, people, communities, the environment (Daly and Cobb, 1990[vi]). Criteria for exclusion include: difficulty in describing the feature in calculable numbers (e.g. human well-being); belief that they were indestructible (e.g. soil fertility; fish stocks; supportive social communities); ignorance (e.g. how the biological world constructs and deconstructs material)

By breaking the laws of the way the world works *in reality*, be it through ignorance or intent, our species has constructed a way of life for itself that has turned out to be inimical to maintaining the capacity of the natural world to sustain life – or, more accurately, is inimical to sustain living systems convivial to a big mammal like the human species. It would be the ultimate hubris to imagine we are capable of destroying all life! There are some species that thrive in extremes of temperature and pollution (at the bottom of volcanoes, for example) and some desert plants that can thrive for decades without water. Human beings don't last long without food and water, or without a very narrow temperature range.

Before turning the corner of this analysis to start to explore how we might forge James Hutton's theory of the world with that of Adam Smith in order to craft a new theory for taking our species into a successful 21st century and beyond, this section looks at some of the laws that should and must guide and govern how our species progresses forward in time. *In reality*, they are all part and parcel of the same basic law of the Earth – that everything is connected. Everything on Earth is in a special relationship, or as James Lovelock, the chemist who brought James Hutton's theory of the Earth as one system up to 20th century date would say: all aspects of the atmospheric gases and surface rocks and water are regulated by the growth, death, metabolism, and other activities of living organisms (Lovelock, 1979). Most recently, climate scientists, in the largest, most rigorously reviewed research project of all time, have added even more evidence of the Earth as one system as they discover more about the intimate relationships between clouds, shrinking ice coverage, ocean currents and micro-organisms and so on.[vii]

The evidence we have around us is that our species is now clearly operating 'outside' the laws that govern the Earth's system of running life. Our relationship with the Earth has become so bad and the damage we are causing to the rest of nature so extreme, that the co-evolutionary partnership without which we cannot continue, is in jeopardy. This section describes six 'Laws of the Earth' as a way of exploring where we have failed to understand *enough* about the way the Earth 'works'. The idea is to try to illuminate what we need to do to restore our relationship

with our co-evolutionary partners to one of love and respect – on the assumption that few will harm those they really care for.

Since James Hutton lived, fortunately, and recently at an accelerating pace, some fine brains have done a lot of work already. So, if we are able to stand on the lessons of the past, and on new scientific and philosophical insights about how the world works and how human activities inter-react with it, maybe we can become wise enough to plot a different course for our species over the next 100 plus years. A course with a chance of being sustained over the even longer term.

The six 'laws' cover ecology, evolution, biology and physics, spirituality, and our evolutionary strategy, and the division between them could be seen as arbitrary. The goal is principally clarity and understanding for those who may lack knowledge in these areas.

a) Of Ecology

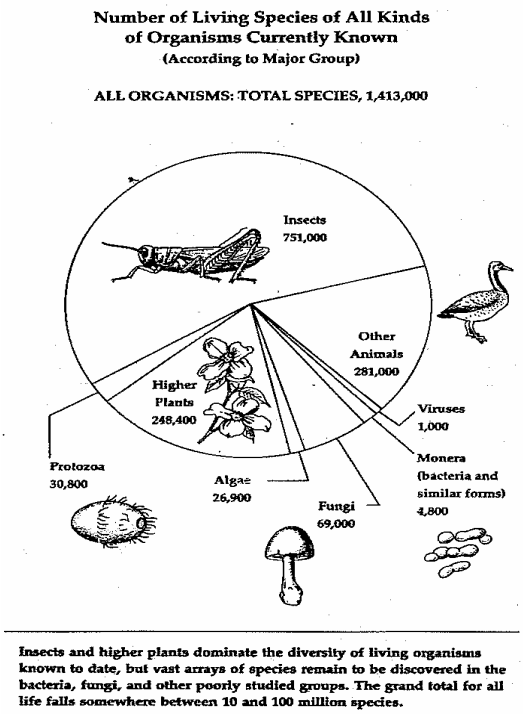
1. That there is no Chain of Being: life is the result of great networking

2. *Big, fierce, predatory animals are rare*

Nature, believe it or not, is highly organised. Where there is liquid water, organic molecules, and an energy source there is organised life. As scientists like Edward Wilson point out: "Given the near universality of organic materials and energy of some kind or other, water is the deciding element on planet Earth" (Wilson, 2002: 3). Another key 20th century scientist, Vladimir Vernadsky, noted that our species is part of the "terrestrial envelope where life can exist. Basically man cannot be separated from it: it is only now that this indissolubility begins to appear clearly and in precise terms before us" (Vernadsky, 1945). Vernadsky (1998[viii]) called living matter 'animated water'. The Earth is in fact 70% water, with 97% of that in the oceans. Two-thirds of the human body weight is water.

The idea of a Chain of Being with the human species at the top is a nonsense derived from otherwise helpful methods of classifying living organisms. The ideas of tree branches – or families – of species started it all. However, latterly, study of the DNA of organisms revealed that we are all what Colin Tudge calls "variations on a theme", making differentiating between a frog and a fungus interesting but not crucial to understanding how life on Earth works (Tudge, 2000). In fact, thinking of ourselves as outside or even on top of this fantastically rich and organised system of life ought to be replaced by an understanding of just how much we are a part of and dependent on it. And to reflect humbly how little it might be dependent on us. "We *Homo sapiens sapiens* and our primate relatives are not special but recent," is how Lynn Margulis (1998) puts it: "we are newcomers on the evolutionary stage."

Figure 2: The Diversity of Life



Source: Wilson, Edward O. (1992) *The Diversity of Life*, London, Penguin Books

Considering the current knowledge that puts the number of *known* species of insects at least 3 times that of either known animals or higher plants, (See Figure 2: The Diversity of Life) Colin Tudge recalls an earlier British biologist J B S Haldane remarking that for someone who saw humankind as His ultimate achievement "God seemed inordinately fond of beetles". Tudge also points out that the actual number of living organisms – known and unknown - may be vastly over the current 30 million estimate, with bacteria and archaes (distinct from bacteria and fond of extreme conditions, like hot springs) alone maybe being ten thousand times more than current estimates of 40,000.

Over the past twenty years or so, Fritjof Capra has deepened and broadened our capacity to see how the principles of ecological relationships – the systems that operate at all levels – can guide us not only in our relationship with 'others' in the living world, but within our own minds and social systems. Resilience in a biological system, Capra explains, is created by dense and systematic networking of living systems at different levels: chemical interactions; molecular and cellular organisation; species symbiosis; global eco-systems. The same resilience can be brought into the human endeavour by using the same networking principles. *Vernetztes Denken*, or network thinking, for example, regularly exposes the errors of understanding (and therefore failure to take wise decisions) that arise from isolating 'bits' of what is actually part of one system.

So, while humans have grown to believe themselves the climax of evolution, and have developed an approach to running our societies and their economies in a King-like way - as if they were above the rest of nature - we are in fact hugely dependent on it. Moreover, the more we damage (through ignorance or intent) the multi-level ecological relationship of the natural world the more vulnerable we become. As a

large mammal we are less able than beetles to adapt well to a significant change in the co-evolutionary partnerships.

We may be able to learn a lot about the ecological system of the Earth, but imagining we can direct and manage it to suit ourselves is fantasy. We are either in the great network of life on Earth, and play according to the rules, or we are out.

Undeniably, the human species is a super-efficient predator: "less strong than a lion and less patient than a crocodile, but far more cunning and able, as they are not, to kill at a distance, without personal risk; and able, too, through agriculture, not simply to predate but to shape the entire landscape to our needs and whims" (Tudge, 2000: 610). We have, however, as Colin Tudge (1989) and others point out, broken the ecological law that says big predatory animals are rare. Very few large animals can be counted in millions, or even hundreds of thousands, except perhaps the crab-eater seal of Antarctica. Ten thousand years after the end of the Ice Age when archaeological records showed us starting to farm on a significant scale, there were probably around 10 million human beings on Earth. At the start of the 21st century there are over 6,000 million of us, with the latest projections from the UN expecting that number to arrive at around 10,000 million in 2050.

As other big mammals like tigers and gorillas struggle for evolutionary survival, so our species multiplies in numbers, in its spread around the world, and in its negative impact on our habitat. For a long time that impact was disregarded, not perceived, or viewed as unimportant. The effect on other large mammals was noted as their habitat degraded and shrank in the face of human growth in numbers and activities. But it was not until very recently (in historical as well as evolutionary timescales) that the impact of our thoughtless expansion as a species became apparent.

Importantly it is not only the numbers of people that matter, but also what they do. Table 1 (Numbers matter, but so does space and impact) shows differences in population density between some countries, as well as differences in their per capita carbon emissions.

TABLE 1: Numbers matter, but so does space and impact

People	Carbon emissions per sq km	p/capita p/year
Bangladesh	954	0.2
Netherlands	478	8.7
England & Wales	389	9.6
Japan	336	9.3
India	324	1.1
China	143	2.2
European Union (25)	118	2.8
Kenya	53	0.3
Iraq	50	3.3
South Africa	36	7.4
USA	29	19.8

Multiple sources

Population growth is slowing. Between 2001 and 2002 74 million more people were born than died, bringing the total population to 6.2 billion. But the growth rate of 1.18% was the lowest since rates peaked at 2% per year in the mid-1960s. However, because of the larger total numbers of people each year, the annual addition didn't start to show a reduction until after its peak of 87 million in 1989. Key contributions to the slowing birth rate include access to contraception and the education of women generally, and in east Europe to the collapse of economies and therefore uncertainty about the future. Only 10% of people in west Europe live below the poverty line, compared to nearly half of those living in central and east Europe and the former Soviet Union (Worldwatch Institute, 2003).

Pressure on environment and other societies from population movements, voluntary or forced, has grown to the point where it is viewed as a security issue, a matter we return to in the final Chapter (see e.g. Goldstone, 2002). While the developed world is worried about an aging population, globally there is worry about a rapidly growing young population – over half of the people living in North Africa are under 20, a rowable distance across the Mediterranean to the European Union.

So as well as posing significant problems to the environment, our numbers and our activities are also troublesome to us. The environment is not comfortable with us, and we are not comfortable with each other.

b) Of Evolution

3. The safety catch of evolution is its slowness

The cumulative impact of the absolute numbers of people on earth is important, but so is understanding how the human species has managed to override (so far at any rate) the ecological laws that have up to now developed through and currently mediate evolution.
The short answer is that only humans have developed technological (and some would argue social systems also) at a speed that far outstrips that of the normal pace of evolution. There is continual change and experimentation in the natural world. Lots of mistakes and wrong turns are made every second, as cells (including human ones) replicate and repair continuously, but change, including genetic change, is extremely slow and measured in evolutionary timescales. On our 4.5 million year old planet, it is likely that the successful living organisms around today took most of that time to get here!

Recognisable ancestors of our own species, *Homo sapiens sapiens*, date back around 4 million years, yet we are not the only species to develop tools to achieve certain aims. A Galapagos finch, for example, trims bits of stick to poke into holes in trees to get at bugs, and beavers dam rivers. But unlike other animals that use tools, our tools are not easily biodegradable. Moreover, in the twinkling of an evolutionary eye, they have enabled us to go faster than any animal and higher than any bird (the first aeroplane flight was 103 years ago, and we only went supersonic in 1947). We are one of the few species that uses the whole of the Earth to carry out our life cycle, but unlike other animals (e.g. birds and fish) we do it unthinkingly and destructively.

c) Of Biology and Physics

4. The natural world operates according to universal scientific laws that also apply to us

Ecological and evolutionary laws rest on universal scientific laws of biology and physics. All species either play by the rules, as we might on a football pitch, or they find themselves out of the game. Thinking about the evidence of our impact on climate systems, you could say our species has been given the evolutionary equivalent of a yellow card.

Fortunately, and even for someone without a scientific background, the rules of the evolutionary game are not too hard to understand if a little time is taken to think about them. Given their importance it is astonishing that most people leave school or graduate without knowing the first thing about them.

The provision of the most essential elements for human life – air, water, nutrition – depends totally on the proper functioning of the planetary ecological systems. These are the carbon, nitrogen and sulphur cycles, the climate systems, and so on, which are not separate, but work together. All life depends on these very complex inter-related systems which are incredibly resilient (though not indestructible) thanks to nature's great networking. Testing these systems to destruction (which is what we seem to be doing) is not an intelligent evolutionary move for a highly dependent mammal. We don't thrive as some Archaea do in extremes of temperature or pollution, nor do we last many days without water, as do some species of desert plants that are able to survive without it for many years.

The only net producers of energy and raw materials (matter) in a concentrated or structured form are green cells. It is concentration and structure that create the 'quality' that renders it useful to us. For example, energy from the sun is used to assemble a range of chemical and molecular ingredients into a tree. We can obtain shade, furniture, food, medicine and fuel from a tree, but not from the elemental ingredients if they remain dispersed. Carbon, nitrogen, oxygen, hydrogen, sulphur and phosphorus are the principle biochemical elements of all life – including our bodies.

Energy and raw material (matter) can neither be created nor destroyed: they can only appear in different states. Whether energy and raw material (matter) comes in a form highly structured by nature (like a tree) or ourselves (like a brick or piece of steel), or whether broken down into individual elements by being eaten, rotting, eroded by the weather or rusting, they do not disappear. In other words, energy and raw material may have a different form, but they always stay around. These are the so-called Conservation Laws[ix].

Following on from the Conservation Laws is what is known as the Second Law of Thermodynamics: the overall tendency is for everything to return to its elemental state. However complex the structure, everything, including our own bodies, tends to return to its elemental ingredients either by natural decay or through our intervention, like setting fire to a piece of coal or wood. Huge efforts have to be made, for example, to prevent human-made structures like buildings or cars from eroding or rusting.

The capacity of the natural world to continually recycle elements in order to build structures of immense complexity and beauty - as well as utility - despite the very powerful tendency to breakdown and decay is little short of miraculous. However, in our attempt to defeat the last scientific law cited above, large quantities of synthetic chemicals are being pumped into Nature's construction and de-construction cycles. This is on top of the already heavy charge of human-generated waste that the cycles do recognise. Despite the immense power of the natural ecological cycles, all the evidence points to them becoming overwhelmed by the volume, or damaged by the toxicity, of the material we are asking them to process.

It was an engineer, Sadie Carnot (1824), who first articulated the thermodynamic principles of energy change, and a NASA rocket scientist who observed that:

"… the technology of man may be regarded as a heat engine and as such is subject to the thermodynamic principles which govern energy transformations. In this context, pollution in its myriad forms is seen as the agent by which the total energy is dissipated into the environment … [pollution] is the inevitable consequence of the technology energy flux to which the organic world is not adapted." (Muller, 1971).

Translated, this simply means that any 'stuff', be it energy or raw materials taken into, and changed by, the human economy inevitably (because of the laws of Conservation, and Thermodynamics) ends up as waste and pollution. We can be more efficient in the way we use resources, but unless we actually use less 'stuff' in the first place, the amount of waste and pollution generated by our economy cannot be diminished. This is neither an opinion nor a theory. It is a universal scientific law.

d) Of the Spirit

5. Our souls and spirits have evolved with and through the rest of life

Fascination with the human mind, soul and spirit and their relationship with the natural world permeate all of human history – from wondering why our brains are so big (evolved for survival? sex? sociability? all three? (Tudge, 2000: 498) to believing cognition (the process of knowing) is part of the process of life [x] or even that "the universe begins to look more like a great thought than like a great machine"(Jeans, 1930, quoted in Capra, 1982).

Fritjof Capra points out that the word for "soul" and for "spirit" means "breath" in many different languages:

Soul	**Spirit**
Greek *psyche*	Greek *pneuma*
Sanskrit *atman*	Hebrew *ruah*
Latin *anima*	Latin *spiritus*

Thinking about the connection between the breath of our inner life and that of our outer one may not work for everyone, but most people are searching for a deeper meaning for life than a purely materialist one, and it doesn't take much for them to connect their own physical and metal well-being with that of the environment. As Bob Brown, the charismatic Australian Senator and consistent and courageous

defender of the Australian wilderness put it: “Our bodies and minds are made for wildness. Through millions of years, every human cell has been created and made ready for the Earth’s terrain. The spread of our toes, the grip of our hands, the curl of our ears to catch the faintest movements of air molecules by fur, feather or fin: billions of wilderness cells making us up.” (Brown, 1987).

However diffidently they approach the ineffable, many of the books referenced in this paper refer to the metaphysical dimensions of sustainability as well as the physical ones. It doesn’t take long for any logical train of thought about sustainability to arrive at the steps of our deepest relationship – with our own souls. Tim Jackson, for example, gives one of the most easy to understand explanations of the physical laws that govern the material world. But in the final section of the book (Beyond Material Concerns) he points out that, by accepting material definitions of wealth, society has “accepted a kind of poisoned chalice. Offering sanctity of choice, fulfilment of our desires, and the greater good of fellow human beings, it has delivered environmental destruction, economic instability and new alarming kinds of poverty: poverty of identity, poverty of community, and poverty of spirit.” (Jackson, 1996) It is this impoverishment – over and above material poverty – that creates the sort of black hole of the soul that too easily sucks in extremist and simplistic representations of any spiritual certainty whether it is touted by high priests of Anglicism, Islam, the New Age or nihilism.

One of the most significant writers on ‘green’ spirituality is Charlene Spretnak. She sweeps wide over history, literature and spirituality to make a thoroughly robust and ‘post-modern’ analysis of the human condition. Her book, *The Resurgence of the Real* has been described as “nothing less than a spiritual guidebook for life in the next millennium” and the bibliography is ideal for any reader wanting to go deeper into a range of intellectual and spiritual traditions or even sideways into green politics. Spretnak’s punch line in this and her other writings, is that our spiritual and our material presence have co-evolved with each other and the rest of life. And that as long as we forget that (as modernity in both politics and religion has) the quality of our spiritual and our physical lives will shrivel with the rapidly degrading environment around us. Indeed a pre-requisite for tackling that degradation is restoring quality to our spiritual relationships – with ourselves, each other and the Earth. It may not be completely true that you do not hurt someone or something you love, but more often than not, you cherish what you love and respect (Spretnak, 1997).

e) Of our Species

6. *Successful evolution is a collaborative venture*

Until the last 2 or 3 decades, ecology and earth system science were in the scullery of academe; Cinderella subjects with a small number of devotees. It was not until the 1980s when what has become the biggest scientific research programme ever, began to explore the mechanisms, consequences and possible mitigation or avoidance strategies of what is now called climate change. But, interestingly, the more we discover about the systems of the Earth, the more we find out how little we know about the biological and physical and ecological mechanisms that, for eons

and as a team, have created, developed and maintained a life-supporting environment that eventually evolved us – as part of that team, not apart from it.

And we possibly may never know how the world works. It could be that the mystery of life turns out to be beyond our understanding.

What we do know from biological and ecological scientists is that success, in evolutionary terms, depends on collaboration at all levels. Vetch and clover live symbiotically with nitrogen-fixing bacteria on their roots. In our case, we depend on a good relationship with bacteria in our gut, with other members of our species, with other species and the rest of the environment. We are, as scientist Lynn Margulis puts it, the result of a collaborative work programme consisting of "thousands of millions of years of interaction among highly responsive microbes." If the biological world was a company, the model for its association and governance would be that of a co-operative or a mutual, in the recognition that for each member to survive and thrive, the whole had to too.

The model for *homo economicus*, however, is a competitive one, based on the theory that we each act primarily in a selfish way. The theory of the 'selfish' gene (I must compete to get the best mate), the 'tragedy of the commons' (I might as well cut these trees, graffiti this wall, over fish these waters because if I don't someone else will) and games like the Prisoner's Dilemma (where players have to chose between self- or collective interests) are rolled out as proof.

But it could be argued that these theories are being played in societies that already reward and admire competitive behaviour and individual success more than they do collaborative gestures that spread benefit more widely; that they are culturally not genetically determined features of what it is to be human. Richard Layard (2005) cites an experiment in which people's brains were monitored while playing the Prisoners' Dilemma game. Their brains showed signs of pleasurable activity when they made co-operative moves, not otherwise. This happened before they knew the outcome of the game or whether others had cooperated too. Virtue can have its own reward[xi]. An affirmation of the social explanation for why we have a big brain, and for thinking that Jeremy Bentham was right when he said at the end of his life that the route to personal happiness is unsustainable unless mediated through the happiness of others.

3. AND THE CONSEQUENCE IS …

The risk of breaking the law, of course, is that you will get caught – and held to account. In the last chapter the degrading relationship between human beings and the environment has been explored in a way that hopefully illuminates steps that can be taken to put things right.

1. **That there is no Chain of Being: life is the result of great networking**
2. **Big, fierce, predatory animals are rare**
3. **The safety catch of evolution is its slowness**
4. **The natural world operates according to universal scientific laws that also apply to us**

5. Our souls and spirits have evolved with and through the rest of life
6. Successful evolution is a collaborative venture

The first four and the last of the laws I've put forward are laid down by the Earth not the Supreme Court. For much of human existence we had not been able to test the verity of them by our own scientific method, only by instinct or experience. Now the most modern of scientific methods reveal them to be true, so it is odd that we should go on actively flouting them, and to be fair not all cultures and communities do. But the countervailing laws of modernity mean that the ineffable and the uncountable will go on being marginalised as the economic marketplace globalises. Our super-species now "*doth bestride the narrow world, Like a Colossus*"[xii] in the style of Shakespeare's Julius Caesar, but it is international institutions like the Word Trade Organisation that lay down the rules, not physics or ecology.

Law 5 is, I would argue, also a law laid down by the Earth. After all, it is forgetting that breaths of fresh air nourish us in spirit as well as body, which enables us to pollute it, even as it damages us. The disconnect is mental as well as physical, emotional as well as practical.

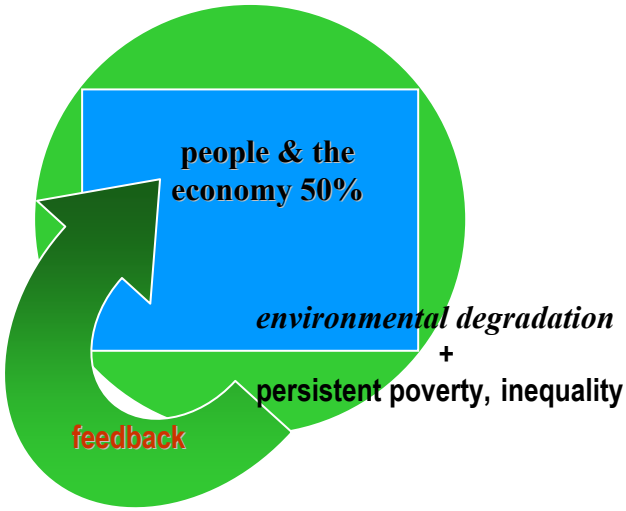
In this section the consequences of flouting Earthly laws are further explored, again in a way that tries to prepare some firm ground for rooting rapid and strong change.

First, in order to find a way of thinking about what all those statistics about environmental degradation mean, I turn to Herman Daly, formally a senior economist at the World Bank, who provides a helpful way of summing them all up. He talks about a world that is already 'full up' (Daly and Cobb, 1990).

An overfull world: *un*sustainable development

To sum up what unsustainable development has caused, Daly and his colleague John Cobb draw on a 1986 study carried out by Stanford University, California which calculated that in order to 'supply' the human economy's annual demand on the natural 'product' of the land, well over 40% of its biological product was needed. That is, nearly half the 'output' of terrestrial photosynthesis (*renewable* 'green' resources) is annexed by the human economy each year (Vitosek et al, 1986).

Figure 3: *Un*sustainable development



Nearly 20 years later other researchers seeking to refine the figures suggest the figure to be approximately 20% (or somewhere between 14% and 26%), though they acknowledge there are still problems with the methodology (what is in and what is out in the calculations) (Imhoff et al, 2004). Probably more important than absolute precision is the regional variation (6% in South America, 70% in Western Europe and South East Asia), and the evidence that the 'take' of 6 billion people is growing very quickly: Moreover:

- It is the 'easiest' 50% we take each year (i.e. the most accessible, easy and cheapest to exploit). Moreover, the world population is only expected to level off at around 9 - 10 billion (in 2050), more than half again the number of people alive today, pointing to an exponential increase in demand on resources between now and then.

- We have to share the Earth's renewable resources with the other species, not only tigers and gorillas, but also the mostly unknown and unseen billions of micro-organisms essential to maintaining the Earth's life support systems: climate regulation, the carbon cycle and so on. The strong signals that the ecological systems are being overwhelmed already are what leads Daly to ask if the world is already 'full up' – it cannot support increased human demand on its resources and services.

- As if this were not enough, such is the extent of our exploitation that each year we render a percentage of what should be annually renewable, non-renewable. We make soils (seas, fresh waters) non-productive through erosion or exhaustion caused by over-exploitation, or sterilised through salt or other mineral overload or impoverishment. The cause can be anything from de-forestation, poor agricultural practice, ill-conceived construction or river damming, but the result is the same – a diminution of available productive land, sea or fresh water. Georgina Mace, of the Institute of Zoology in London, told the "Biodiversity: Science and Governance" conference in Paris that each year 0.5% of natural habitats on land are lost – with losses set to continue[xiii].

Even the most classical economist would see this as an unsustainable trajectory – a rapidly growing human population making increased demand on a diminishing resource base, with unequal distribution of costs and benefits. On top of what is happening to ostensibly renewable biological resources, exactly the same is happening to resources viewed as non-renewable, like oil, gas and minerals. The burning and processing of fossil fuels remains the human endeavour's biggest source of gases and other pollutants that are now damaging the environment and human health on a massive scale.

Now the *consequences* of this mindless breaking of the laws of the Earth are landing on the desks of politicians and economists. The decades of not noticing or pretending not to notice ongoing acts of environmental degradation are over.

Climate change, for example, is evidence that, at a global level, the massively powerful waste management cycles of the biological world are unable to cope not only with the alien substances they are asked to treat, but also the theoretically bio-recyclable substances that are arriving in overwhelming quantities. Accumulation of the wrong elements in the wrong places is altering the biochemistry of the Earth.

The same can be said of human health. There had to be some consequence of introducing into our bodies – either directly or via the environment – a large number of alien substances. Living with the environment has been hazardous for humans since we were an evolutionary twinkle in the eye of our earliest microbial project. Our more recent ancestors learnt by experience how to avoid being eaten by tigers and which plants were poisonous. We are still learning – for example about the health impacts of moulds that grow in grain stocks. But did we really expect to get away with no consequence from exposure to new chemicals in previously unimaginable quantities? Alan Michael, a UK Minister took a blood test and it was reported that 33 chemicals were found.

Sir Tom Blundell, the biochemist who chairs the Royal Commission on Environmental Pollution writes, "we are conducting a huge experiment on ourselves and I am not surprised that a large number of chemicals have accumulated in [human] tissues", and has warned government that the prevalence of untested chemicals in the environment could become the "next tobacco" (see Townsend, 2004). Links are already being made to the dramatic rise in neurological disorders over the last 20 years[xiv].

The impact of climate change on the economy – right now – and anticipated in the future, have caused the UK Prime Minister to put it up with terrorism as the biggest challenges he says he faces, only to be contradicted by his Chief Scientist, Sir David King to say climate change was by far and away the most significant (King, 2004). Insurance companies, particularly the re-insurance giants like Munich Re, have been warning for some time that the costs of insuring against such events were going to become impossible[xv].

Paradoxically, or more accurately inevitably, the Enlightenment economic model is now visibly failing even in its own terms. Poverty is proving to be intransigent. While in east Asia the number of people surviving on less than $1 a day was halved in the

1990s, a huge number remain desperately poor, and overall, over a quarter of the world's countries became poorer not richer over the same period. Both between and within countries there is also a widening gap between rich and poor. Globally, the financially richest 1% of people together earn each year more than 57% of the poorest (UNDP, 2002). There is ecological as well as economic injustice too. It is the world's financially richest 20% of people who appropriate 80% of the natural resources and are therefore inevitably responsible for the bulk of the pollution.

The consequences of marginalising the difficult to count from Enlightenment inspired economic models is, fortunately, not going unnoticed. James Hutton's view of an indivisible world in which we are embedded actors, has its own economist descendants, like Nicolas Georgescu-Roegen and Paul Ekins, to whom I will return later on.

The politics of sustainability

In the meantime, however, the political response to the consequences of unsustainable development has remained pitifully slow and inadequate.

As long ago as 1972 the first UN 'Earth Summit' was held in Stockholm to consider the evidence that the path of human development was on a collision course with the Environment's capacity to support it. Countries set up Environment Ministries after this, and the UN Environment Programme was established. A second UN Earth Summit was held in 1992 in Rio de Janeiro, and followed by the 2002 World Summit on Sustainable Development in Johannesburg. In between, treaties, legislation (in for example the European Union), voluntary codes and campaigning organisations have multiplied.

To little transformative effect. Not one negative trend affecting the renewable environment – forests and other biological cover and diversity, soils, fresh waters, seas, habitats for other species, emissions of waste and pollution – has been slowed, never mind halted or reversed. Small local gains are crushed under the global aggregate of losses. The evidence is well summarised by the World Resources Institute (WRI)[xvi] and the United Nations Environment Programme (UNEP)[xvii]. For climate change the UK Select Committee on Environmental Pollution *Report Energy – The Changing Climate*, is easy to understand[xviii]. The emerging data from the UN Millennium Ecosystem Assessment (started in 2001) confirms the trends, with between 20% and 50% of nine biomes (e.g. grasslands, boreal forests, tropical rain forest etc.) converted into cropland. Worst hit are tropical dry forests, with 35% of temperate grassland and broadleaf and Mediterranean forests replaced by farming. This is not a straightforward equation either – swapping trees for food. With the trees, go things like watershed protection, pollination, protection from erosion.

The failure of unprecedented levels of global and economic growth and affluence to tackle poverty, inequality and other human injustices is summarised by the UN Development Programme[xix]. Inequality, and the drive to tackle poverty through cancellation of debt of the poorest countries, was also at the top of the agenda for the World Economic Forum and then the G7 meeting for Finance Ministers, with (if it

happens) a mould-breaking proposal to tax tourist air travel to fund the poverty relief effort. At the 2002 Summit, the UN Secretary General remarked that the crisis was not lack of understanding about the problems, but "of implementation." Although the so-called Landau tax would be restricted to tourism and not freight and other air transport, an environmental tax hypothecated to deliver a social benefit is a definitely a move in the right direction.

There are those who argue that the evidence of substantial environmental damage is not convincing, and it is of course always wise to consider the validity of the dissenting minority voice. [xx] But in the case of scientific evidence it is essential also to critically analyse the provenance of the evidence. For example, the Intergovernmental Panel on Climate Change (IPCC) set up by government, engages hundreds of scientists in a publicly transparent, fully published and peer reviewed process. [xxi] Their voice is not one with a particular industrial axe to grind. The same cannot be said of research relating to genetically modified organisms, for example, which may have implications of a not dissimilar magnitude.

In the UK policy framework is shaped by international treaties (for example, the Kyoto Protocol on greenhouse gas emissions) and European legislation. (Haig, 1992 et seq).

To give a flavour of other initiatives, the UK Government has also:

- pledged to go beyond its legally binding international commitment to 12.5% reduction in green-house gasses by 2012 (from 1990 levels) to achieve a 20% reduction by 2010, and has accepted the Royal Commission on Environmental Pollution's recommendation that 60% is the real target.
- published a 1999 UK Strategy for Sustainable Development (DETR, 1999) with the sustainability indicators it will be tracking (particularly a 'headline' set of 15) (DETR, 1998). A new strategy, with implementation the major theme, is due for publication in March 2005
- established a team of Green Ministers with the responsibility for integrating sustainable development into government departments [xxii]
- created an Environmental Audit Committee [xxiii]
- developed a 'sustainable consumption and production' policy and emphasised climate change and energy as key research priorities
- built in sustainable development as a key factor for policies and proposals of the Regional Development Agencies
- made sustainable development an aim of the Treasury, and introduced fiscal measures such as a climate change 'levy' on energy use, a tax on waste disposed in landfill, and a carbon emissions trading mechanism (though in aggregate is judged to have performed weakly overall)
- carried out a review of company internal risk management (Turnbull 1999) and published a full review of UK Company Law with recommendations for statutory duties of directors to take a longer view and to include responsibilities beyond shareholders to other stakeholders, including the impact on local community and the environment (2001).

Missing from all of the above, however, is a consistent and coherent enough message from government (for example, environment is not expected to be 'big' in

the 2005 UK general elections) and some serious drivers or incentives that would help individuals, organisations and companies of all sizes to:

- have sufficient knowledge and skills to understand how they may contribute to sustainable development
- feel that any contribution they do make is recognised or rewarded

These are the two great tenets of any behavioural change programme – giving people the competence and the confidence to do things differently, and praising and rewarding them when they do.

At the moment it remains more difficult and mostly more expensive to shift onto a sustainable path – individually or in organisations and companies.

Crisis of implementation

Which is why the crisis of implementation endures. And it is a crisis at the highest level, because government itself does not have a coherent logic within which it can work out what to do next. However aware government may be on the need to act differently, it is still trying to work out how to do it within the current logic of economics. It is not, as yet, searching for a new logic. Which is why, for example, the UNDP reports backward steps for 59 countries on income poverty, hunger, survival, water and sanitation like this: “Underlying all these crises is an economic crisis. Not only are these countries already extremely poor, but their growth rates are appallingly slow as well.” (UNDP, 2003: 3) The sort of economic growth that we know is actively rewarding the externalising of costs to the environment and people, is being proposed as a solution.

So if government itself is at a loss, then no wonder it cannot give a confident lead to people who, by and large, are not only aware that something needs to change but also ready to contribute. At the moment they are getting very mixed messages. People are asked to save energy, but also to seize opportunities to enjoy lower prices; they are asked to use their cars less, but the cost of public transport has risen faster than that of motoring; they are asked to recycle, but facilities remain limited, often hard to reach and squalid. Moreover, doubts are being raised about the environmental wisdom of recycling things like paper and bottles. In the context of rising volumes of waste, recycling, because it happens after the waste is generated, can only make things worse. Recycling only reduces pollution if it takes place in a dropping volume of waste generation.

The rest of this paper explores a possible new logic to bring some coherence and consistency to policy and practice that favours sustainable development. A logic that James Hutton and his disciple ecological economists would approve of, because it is inclusive of those supposedly ineffable and uncountable things that the disciples of Adam Smith have excluded.

4. UNDERSTANDING SUSTAINABLE DEVELOPMENT

No way back to the Garden of Eden

"Since the Neolithic revolution, the transition from hunter-gatherer into farming, which began 10,000 years ago, human beings have been weaned, and have weaned their children on the notion that it was the destiny of humans, and indeed the God-given right of humans, simply to take over the world. The book of Genesis can properly be read as a folk memory of the transition from late Palaeolithic hunter-gathering – when life in the Middle East must have been very good indeed – into the traumas of Early Neolithic farming, which, though hard, eventually prevailed. All the myths and the Godly admonitions of the first four chapters make perfect sense when viewed in that light. 'In the sweat of the face shalt thou eat bread' is what God said to Adam as He banished him from the easy pickings of the Garden of Eden, the hunting-gathering Arcadia, and condemned him to a life of agriculture. And we've been sweating, very successfully, ever since. … But it is time to acknowledge that the Neolithic party is over". (Tudge, 1989)

There are those who hark back to a way of life inspired by the Garden of Eden, but Colin Tudge is right, there is no going back, no undoing of past errors or recapturing past Arcadia. The challenge is to design a new way forward from now. To say it is post-modern (rethinking the Enlightenment) and post-Neolithic is only to acknowledge two different time-scales. Both are concerned with the future of the human endeavour on Earth.

Sustainable development, for better or for worse, is the term that has come to describe that endeavour. So the first step is to give the term meaning, both as a concept and, most urgently, operationally.

Dealing with definitions

There are rumoured to be over 200 definitions of 'sustainable development', and it has become fashionable nowadays to say that it actually defies definition as it is too complex. This is not strictly true. It is not so much the definition that is difficult, but making it happen in practice. No end of changing the language can avoid the fact that, in the end, you have to do it!

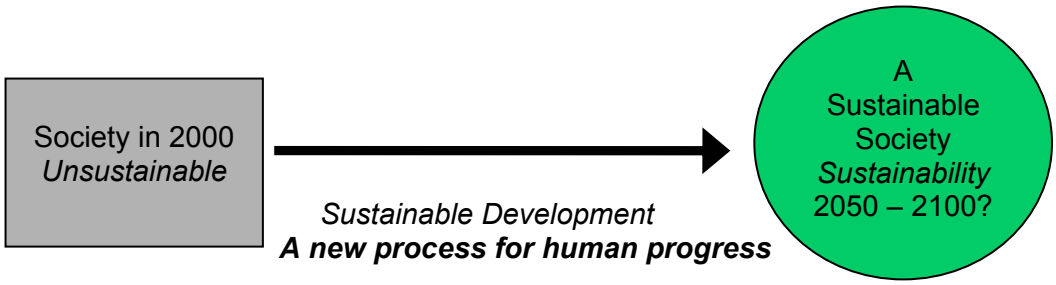
Perhaps the best known definition is the one coined in the 1987 Brundtland Report:

"Humanity has the ability to make development sustainable – to ensure that it meets the need of the present without compromising the ability of future generations to meet their own needs." (World Commission on Environment and Development, 1987)

Sustainable is a common adjective that describes something with "the capacity to continue into the long-term future". So if something has the quality of sustainability, it has the intrinsic capacity to keep itself going more or less indefinitely. It is quality that we want for our species, and for the environment in which we live. It is our goal.

Sustainable development, therefore, is the process whereby, over time, we achieve sustainability.

Figure 4
Sustainable development the process, sustainability the goal



Although it is a bit unfair to reproduce it as it is under review, the UK government states that sustainable development "means meeting four objectives *at the same time*, in the UK and the world as a whole:

- Social progress which recognises the needs of everyone
- Effective protection of the environment
- Prudent use of natural resources
- Maintenance of high and stable levels of economic growth and employment" (DETR, 1999)

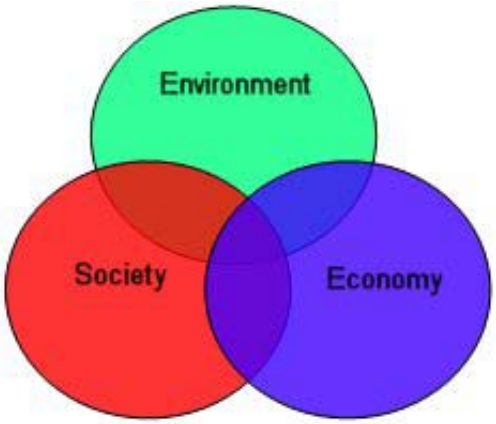
The italics "at the same time" are mine, because more often than not these four bullet points were published even by the government itself without their introductory sentence. This maintained the view that each could be pursued separately rather than as a set. And so missed the essence of what sustainable development should be – which is the progress of human environmental, social and economic goals together. Everyone wants to be prosperous, to live in secure, fair and supportive communities and enjoy a life-enhancing environment. We've forgotten (if we every really knew) that getting them all means marginalising none.

Sustainable Development means progressing our environmental, social and economic goals at the same time, not separately. It is the simultaneousness that matters, as it is only by thinking about the environment, people and the economy as an indivisible whole that we will manage to avoid trading one off against the other.

The real bottom line

Comprehending that sustainable development is about progressing economic, social and environmental goals simultaneously is gaining currency. Businesses and others often talk about sustainability as a 'triple bottom line', or overlapping circles (see Figure 5).

Figure 5
Triple Bottom Line, Sustainability Venn diagram



But while such characterisations are really helpful in clarifying the nature of the challenge of sustainable development, they still don't get us very much further in understanding the challenge in a practical sense. What sort of things go into that little triangle in the centre of the Sustainability Venn diagram? What does the triple bottom line add up to?

A more helpful way of thinking about the relationship between the environment, society and the economy uses the image of nested circles. (See figure 5). This reminds us that the three lines, and the 3 circles, are not in fact of equal weight. So it is not a matter of 'getting the balance right' between them. There is an important hierarchy to be respected if sustainability is to become a reality.

a) The real bottom line is the environment. It sets the limits everything else must respect. Bluntly put, if the environment cannot support life in a way that is conducive to big mammals then we are dead.
b) Next in the hierarchy is society. It is us – human beings – who set the parameters (the goals, and the ethics and values that will govern and guide achieving those goals) for our development. There is a range of mechanisms for making those decisions – some individual, some collective (as a family, at work, as an electorate). We have the power to choose to do things differently.
c) Finally, nested within society is the economy. Ideally, it should be structured in a way that enables society to meet its objectives, within its ethical framework, and obviously respecting environmental limits.

At the moment, however, the world is run with this hierarchy inside out. It is the economy that drives how we must do things as a society (e.g. compete not collaborate, so concentrating on not sharing the benefits of human endeavour), and which currently thrives best where it can substitute off balance sheet environmental degradation for on balance sheet costs. These are the inevitable consequences of marginalising the role of the scientific laws of the Earth. These laws, tested by evolution over aeons, have been totally marginalised in the model for economic success that we currently use as proxy for success of the whole human endeavour.

The market where goods and services are bartered, or bought and sold, is an eternal feature of human relationships, but up to the 16th – 17th century for most people economic and social life were the same thing (economia means housekeeping), and the idea of gain was absent as a normal guide for daily life. Then in the early 18th century, when a fever of speculation in foreign business adventures was exciting Europe, a new idea began to take grip - capitalism. Progress would no longer be mediated by the old control and command model, but by the "free-action of profit-seeking men bound together only by the market itself". The idea of personal [financial] gain that underlay capitalism became accepted as "an eternal and omnipresent part of human nature". (Heilbronner,1983: 30). The sin of avarice – an eager desire for wealth – began its rocky road to ultimate redemption as a mark of excellence in business practice.

The man who gave this new model a philosophy was Adam Smith who in 1776 published The *Wealth of Nations*, in which he formulated his minute observations of British society into an overarching model of 'the market'. Writing 230 years ago Smith saw the market harnessing individual selfishness to provide a flow of benefits to all, and had unreserved confidence that it would lead in the direction "which is most agreeable to the interest of the whole society". [xxiv] The *Wealth of Nations* was 900 pages long, and preceded by another blockbuster of its day, The *Theory of Moral Sentiments* (1759)

Although he was not the first to comment on 'the market' Smith was the first to formulate its workings in a wide and systematic fashion. Today's ferment of observation and critique of social history and relations (including market economics) is a continuation of the debate that Smith started. And because the world is now a very different place, the search for a new logical framework to make sense of what is happening and to bring order and meaning is throwing up new theories. Not least because Adam Smith did not forecast the first industrial revolution which was underway before he published The *Wealth of Nations* and his edict to "let good emerge as the by-product of selfishness" has not delivered automatically, as he believed it would. As a more recent commentator Francis Fukuyama put it: "The tendency of contemporary liberal democracies to fall prey to excessive individualism is perhaps their greatest long term vulnerability." (Fukuyama, 1999)

Sustainable Capitalism

Which brings us back to Adam Smith's friend and executor, sometime doctor, farmer, and geologist as well as philosopher and supporter of public works, James Hutton. Hutton's own blockbuster, The *Theory of the Earth* published 20 years after The *Wealth of Nations* attracted headlines because it shattered a hole in the then predominant Bible-based belief that the Earth was only 6,000 years old. So while Adam Smith did see that his theory of the self-regulating marketplace needed people and the environment to meet its demands rather than the other way round ("… the demand for men, like the demand for any other commodity, necessarily regulates the production of men" (Heilbroner, 1983: 50) it is unlikely that James Hutton saw in his theory of life on Earth as one continuous bio-chemical market-place a model that could challenge that of his contemporary.

The dictionary meaning of the word capital is "any stock of assets – financial or physical – capable of generating income". Yet when it comes to deciding what assets are to be included, there are many opinions. Which is helpful. Because the most logical route to achieving sustainable development would seem to be to shift – or rather extend – the definition of capital.

The challenge, remember, is to progress economic, social and environmental goals together. And to be able to do so despite the fact that they are persistently disaggregated into different government departments, school subjects, university disciplines, and different pages of the newspaper. This makes thinking about sustainable development, never mind doing it, extremely difficulty. The implementation crisis Kofi Annan referred to lies with the compartmentalisation of our institutions and the way our minds are trained. Our social and economic world has been actively prevented from evolving in the same way the biochemical world does and as we have historically co-evolved with other species - as a whole, and at the same time.

Changing the physical institutions of modern society will take more time (I don't see treasuries and environment ministries merging that quickly), but at least our minds evolved with the capacity to handle complexity and subtlety, not least in our social relations. So there seems to be no reason why our collective minds can't create a new, Hutton-inspired and integrated way of thinking about our place in the world, and how we might handle our relationship with it better.

Which is where the idea of sustainable capitalism comes in. The starting point is to consider the definition of capital. If the idea of capital as a stock of assets is taken literally, a question can be posed – just what are the assets (or resources) available to us as we try to live within the laws of the Earth, and as happily as possible with each other? Described in some detail by Paul Ekins in 1992 (Ekins et al, 1992) a 'four capital model' was developed by, amongst others, The World Bank (Serageldin and Steer, 1994) and Forum for the Future, until five categories of capital assets - Natural, Human, Social, Manufactured, Financial – were identified.

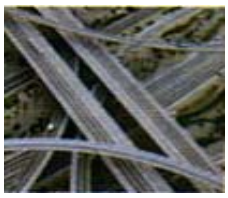
Figure 6: The Five Capitals explains in more detail what is represented by each stock of assets. The point being that if investment in each of the assets is sufficient to maintain and enhance ALL of the capital stocks at the same time, then a flow of benefits can be expected. In theory at least, that flow of benefits would constitute a path for the human endeavour that could be described as sustainable (i.e. capable of continuing into the long term future.) In practice, the causal link between benefit flow and capital stock may be less than 100% certain, but it will certainly be good enough to take us off an unsustainable trajectory and in a new direction towards sustainable way of life

It may seem historically arrogant to say that just as Adam Smith grew his unifying and clarifying theories from observation so does the theory of the five capitals. In reality, we are only knitting back together theories about the evolution of the Earth and about the evolution of society that should never have been separated in the first place. Indeed, in a lot of cultures, the notion of the environment and society as indivisible still endures. It is only the children of the European Enlightenment who

ended up developing the one hypothesis (Smith's) to the exclusion of others (Hutton's).

Figure 6
Sustainable Capitalism: The Five Capitals

Financial Capital *is viewed by many as different from the other four capitals in that it has, strictly speaking, no intrinsic value; whether in shares, bonds or banknotes, its value is purely representative of natural, human, social or manufactured capital. Financial capital is nevertheless very important, as it reflects the productive power of the other types of capital, and enables them to be owned or traded. Some would argue that a society's trust in financial capital as a means of exchange is an important element of social capital.*



Manufactured Capital *comprises all human fabricated 'infrastructure' that is already in existence. The tools, machines, roads, buildings in which we live and work, and so on. It does not include the goods and services that are produced by them. In some cases manufactured capital may be viewed as source of materials (e.g. building waste used as aggregate for road building or repair).*

Social Capital *is all the different co-operative systems and organisational frameworks people use to live and work together, such as families, communities, governments, businesses, schools, trade unions, voluntary groups. Although they involve different types of relationships and organisation they are all structures or institutions that add value to human capital, and tend to be successful in doing so if based on mutual trust and shared purpose*[xxv]*. Again the importance of social capital is only recently being recognised, unfortunately though the increasingly visible negative effects when it is eroded*[xxvi]*.*

Human Capital *consists of the health, knowledge, skills, motivation and spiritual ease of people. All the things that enable people to feel good about themselves, each other, and to participate in society and contribute productively towards its well being (wealth). Recently recognised as providing a high return on investment, especially in developing societies where investment in human resources is viewed as possibly the most essential ingredient of development strategies*[xxvii] *but also in the highly industrialised world*[xxviii]*.*

Natural Capital *(also referred to as environmental or ecological capital) represents the stock of environmentally provided assets and falls into two categories.*

Resources*, some of which are renewable (trees, vegetation, fish, water), some non-renewable (fossil fuels, minerals). In some places ostensibly renewable resources (like fertile soil) have become non-renewable (desert).*

Services*, such as climate regulation or the powerful waste processing cycles that breakdown, absorb, and recycle emissions and waste from all species*

Indeed, a reflection on the laws of the Earth in Chapter 3, confirms that there are, in reality, only two sources of wealth and well-being. That which flows from the resources and services provided by the Earth (natural capital), and that which flows from our own hands, brains and spirits (human capital). Everything else derives from these two primary sources. As one of the early ecological economists was fond of pointing out, in the beginning Man (sic) lay naked on the grass. The mistake we made was to account for everything he created around him (clothes, shelter etc) financially instead of biologically. [xxix] Go a bit further, and given that the human species is a miraculous assemblage of basic natural elements in continual exchange with the elements around us, we could say that human capital is in fact a sub-set of nature. A true if sobering thought that confirms the overriding importance of achieving environmental sustainability!

Forum for the Future and others are already using the Five Capital model to provide an adaptable but rigorous 'sustainability framework' in which to design or audit ideas, decisions and initiatives in a way that ensures they are more likely to favour sustainable development than to undermine it. For example: The Department for International Development, [xxx] Wessex Water, Co-operative Bank, and Interface, a large carpet company. [xxxi] There is more about how it works in the next chapter.

Interestingly, when people set about describing what benefits they feel would flow from suitably healthy stocks of the capital assets, the result is, if not a modern-day version of Arcadia, then certainly close to the aspirations of most people – for themselves and their families. Figure 7 (Sustainable Capitalism: Stocks and Flows of Five Capital Assets) gives some examples.

Figure 7: Sustainable Capitalism: Stocks and Flows of Five Capital Assets

FINANCIAL	**STOCK: money, stocks, bonds** ***FLOW**: means of valuing, owning, exchanging other 4*
MANUFACTURED	**STOCK: tools, infrastructure, buildings,** ***FLOW:** places to live work, play; access to them*
SOCIAL	**STOCK: governance systems, communities, families** ***FLOW**: security, justice, social inclusion*
HUMAN	**STOCK**: **health, knowledge, motivation, spiritual ease** ***FLOW**: energy, work, creativity, love, happiness*
NATURAL	**STOCK**: **land, sea, air, rivers, ecological systems** ***FLOW**: energy, food, water, climate, waste disposal*

This way of looking at definitions of sustainability, and of expanding our idea of what constitutes capital assets available to us as a species as we contemplate progress in the 21st century, does provide us with a robust and logical intellectual framework

within which we can work out what to do in a way that makes it more likely to contribute to sustainable development (i.e. make a positive contribution to maintaining or enhancing all five capitals together).

A practical example might be a new social housing project. It may surpass the highest energy efficiency standards (helping to maintaining natural capital), and may have delivered significant improvement in the stock of human and social capital through better health and reduced vandalism. But if it was built on part of a park rather than on a brownfield site (thereby decreasing natural capital) what is its net contribution to sustainable development? There is no easy answer to that question of course, but thinking about actions in this way can lead to changes in the planning and design stage which can avoid negative impacts and increase the contribution of the initiative across the board.

Also, thinking about the environment as one capital opens up questions about why we are prepared to diminish its capital stock, rather than live off the interest. We take risks with financial capital, sure, because the market-place is designed to encourage and reward risk. But to do the same with the ecological systems that govern climate stability? Even the boldest financial investor would blanch at that sort of risk. And how come that we recognise the flow of benefits to be had from investing in, say, our railway infrastructure, or education, yet don't do the same when it comes to the environment? Despite the evidence that even bird-song in airport business lounges and water falls outside hospital ward windows make us happier and stronger, we don't see investing in the environment as an important thing to do. Probably not out of badness, but certainly out of ignorance that without a healthy environment, there is no health, wealth and happiness for us.

5. 21st CENTURY LOGIC: SUSTAINABLE CAPITALISM?

In the last chapter we looked at definitions of sustainable development and introduced the notion of Sustainable Capitalism as a possible foundation for a new logic that will help us decide and act in the 21st century in a way that contributes to, rather than undermines, a sustainable path for human development.

The temptation at this point is to write the equivalent of a 'green' political manifesto – a dogmatic 'to do' list for any developed government or global institution like the UN. If you have the habit of looking at the world through a 'sustainable capitalism' prism, then the logic of such a list would be self-evident. But most people are not in this felicitous situation! We are long way from human happiness being anything but a rhetorical objective of our society. As this is being written, the UK newspapers are bemoaning, without irony, the fact that the national economy will suffer because the volume of trade in the weeks running up to Christmas is below expectations. Yet how many questions are being raised about the resilience of an economy that depends so heavily on annual gift shopping for its success in its own terms, never mind about its capacity to deliver happiness in a reasonably even handed way?

It is the intention of this chapter, therefore, to visit some of the new thinking and practical initiatives that are beginning to populate and otherwise make sense of 'sustainable capitalism', and, in doing so, try to create a better understanding about what sustainable development might *mean*, all in a way that encourages people to

'have a go' wherever they have scope for influence – at home or at work, in policy or in practice.

As Daly and Cobb point out, the idea is not to overturn capitalism *a la* Karl Marx, but to modernise it in the light of new knowledge and understanding that was not available to people like Adam Smith living 230 years ago. In his Foreword to the English edition of Daly and Cobb's *For the Common Good* Paul Ekins sets out the central problem. The models of conventional economics that have developed over the last couple of hundred years systematically marginalise and exclude two of humanity's most treasured assets: a supportive local community and a healthy, productive natural environment. They were regarded as either not important or indestructible. As a result, today's economic system has developed in a way that ignores or devalues the very aspects of economic reality which should be emphasised. Consequently we find ourselves in a crazy (and dangerous) situation where:

1. The market has a tendency to erode the two key conditions for its own success:
   - Competitiveness. This is undermined by increasing corporate concentration – the winner taking if not all, then nearly all (e.g. supermarket chains, motor manufacturers)
   - The "containing moral context of the community". This is destroyed by increasingly uncontrolled self-interestedness. Caring for others is not rewarded, while financial greed is.
2. There is an unlimited tendency towards physical production growth in a finite environment [xxxii]

My assumption is that if Adam Smith and James Hutton were miraculously to return to life now, they would not disagree with this point of view. Rather they would regret they did not do more to merge their theories at the time, and be surprised that it is taking us so long to put right what has for many decades been so obviously been going wrong.

But first, a preview of the final chapter in order to equip the reader with some mental and practical tools of their own to help judge the assertions in this chapter, or even to 'have a go' and test them on initiatives from their own scope of activity.

One of the advantages of the Sustainable Capitalism model is that the five capitals identified do represent the totality of resources available to any modern Major General (MMG) taking over command of The Earth. Strategy is a word with deep military roots (from the Greek, *stratos* an army, and *agein*, to lead) (*Chambers Dictionary*, Ninth Edition) and the first task of an MMG given the mission of taking the human species from here to sustainability would be to appraise the resources he or she (this is a *modern* Major General!) has available to accomplish it. The five capitals, or sets of resources, represent the total number of 'battalions' available, and if they are all brought into good shape and manoeuvred intelligently and in a co-ordinated fashion over the territory (say, the next 50 years) then the benefit that flows should add up, *theoretically*, to a sustainable path for human development.

Which is fine, *theoretically*. But how does that theory translate into being able to have *reasonable* confidence that progress on a more daily basis is contributing to sustainability or not? We will return to the ideas of *reasonable confidence* in the final chapter, but for the meantime, here is an introduction to one of the tools that is becoming increasingly popular as a way for anyone, whether thinking about their household, a major plc or industry sector, or a government department.

As we have not run a modern human economy within the logic of sustainability, we are *by definition* involved with *new* practice. So relying on old check lists or collections of 'best' practice *inevitably* puts a brake on forward looking innovation. Making the transition into the sustainable capitalism of the 21st century will require us to be creative as never before. We need that big brain of ours (the most powerful non-linear computer around, remember) to make lots of connections and resolve some of the biggest challenges between now and a sustainable way of life for all.

Operationalising Sustainable Capitalism

Reversing the hundred plus year habits of modern society in thinking about things in a disaggregated and disconnected way rather than systemically or holistically is hard. Life, as earlier chapters have described, is complex and infinitely interrelated. So in modern society we do need some tools to help us think and decide in a joined up way.

Here we briefly describe how the Sustainable Capitalism model can be used and tailored to fit different circumstances, so taking a joined up systematic approach is easier. The application illustrated here is for a university.

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The five sets of resources or 'capitals' (natural, human, social, manufactured, financial) are used to form one axis on a grid or matrix. What ever suits the circumstances of the analysis makes up the other axis. In the Forum for the Future Higher Education Partnership for Sustainability (HEPS) initiative, for example, the horizontal axis reflected on the three manifestations of a university:

a) **as a business in its own right** (procuring services and goods, managing people, estates and financial resources)
b) **as a provider of learning and research** (what a university is in business to do)
c) **as a member of different communities** (e.g. neighbourhoods, academic and research groups, international collaborations) [xxxiii]

This same analysis of the operations of an organisation also works with a business, a corner shop, or even a household. Following is an example of an empty grid:

	as a business	***as a place of learning and research***	***as a key member of the community***

NATURAL			
HUMAN			
SOCIAL			
MANUFACTURED			
FINANCIAL			

Once the grid is established, then a key question may be asked of any initiative, or about the current performance of the university (or business etc). This is best done by a group of people who are involved in and/or likely to be affected by the initiative.

a) What does the initiative, and the various parts of it, contribute to maintaining or, ideally, enhancing each of the stocks of capital? Negative consequences may also be identified.

b) In appraising current performance and planning future objectives of an institution, two sets of questioning may be done. First to identify what is being contributed to maintaining or enhancing each capital stock now. Then a repeat exercise asks participants to identify what, under no constraints and in line with its vision and mission, the university would like to be able to say it contributes.

c) Finally a plan for getting from now to the best possible contribution can be developed that incorporates imperatives set by government policy or institutional priorities or any other relevant parameters: time, money, and so on.

An example of a grid that contains an illustrative summary of the many things a university could do to contribute to sustainability, collated from ideas from the HEPS initiative, is given [in Appendix I]. In reality, different organisations and universities will make different entries to different boxes on the grid, and may even leave some blank. A similar exercise, done for a large banking corporation [Appendix II] and the Chemical Industries Association [xxxiv] [Appendix III] are also included for comparison.

The point is that not everyone needs to, or can, do everything. Which is why one size fits all tick lists tend to set people and organisations up to fail. Each of us has a contribution to make, and the potential to grow that contribution over time. Being able to see all possible contributions *together*, and *at the same time*, helps minimise the trade-offs that grow one stock of capital at the expense of another.

To help what is quite a difficult exercise for many people more tuned to thinking more in terms of processes than outcomes, or if in outcomes then in a compartmentalised rather than a 'joined up' way, Forum worked with Keele University in England through an EPSRC Global Environment Programme grant to research a set of 'sustainability criteria' that would fit into the sustainable capitalism framework. The research drew on a number of sources; academics, national and local government, and NGOs, with over 60 people attending various seminars and feeding into drafts.

The result was more a set of sustainability 'conditions' enshrined in statements that would be true if we were standing in a sustainable society. These statements themselves had to meet some rigorous criteria:

- **Comprehensive** in that they incorporate the various ecological, ethical, social and economic dimensions of sustainable development.
- **Consistent** internally (amongst themselves), and externally, with scientific laws, and other respected methods of conceptualising and understanding sustainability (e.g. the Natural Step).
- **Culturally neutral** so they are relevant to and widely applicable in any part of the world thus facilitating learning from and between different cultures.
- **Non-prescriptive** so they remain *characteristic* of a sustainable society and do not prescribe what the precise ingredients might be.
- **Congruent** with the general aspirations of people and communities (i.e. the flow of benefits that would be achieved from healthy stocks of the various capitals is echoed in LA21 visions, surveys, etc).
- **Straightforward** and as few in number as possible without losing clarity or causing overlap.

The 12 statements are shown in relation to the stock of capital they associate with[xxxv]. Importantly, a range of questions can be established tailored to specific groups of people or initiatives that make the process of thinking about what they do through a sustainability 'lens' more real. For example, the first statement relating to social capital: *There are trusted and accessible systems of governance and justice,* could prompt for a university a series of questions relating to how Councils and senior management work together, how HR systems support diversity or access policy, how complaints are dealt with, memoranda of understanding or collaborative arrangements with local authorities, transport companies and so on. A company would replace Councils with its board and shareholders, but may otherwise have similar questions.

	12 Statements that would be true in a sustainable society
Financial Capital	1. Financial capital accurately represents the value of natural, human, social and manufactured capital
Manufactured Capital	2. All infrastructure, technologies and processes make minimum use of natural resources and maximum use of human innovation and skills
Social Capital	3. There are trusted and accessible systems of governance and justice 4. Communities and society at large share key positive values and a sense of purpose 5. The structures and institutions of society promote stewardship of natural resources and development of people 6. Homes, communities and society at large provide safe, supportive living and working environments

Human Capital	7. At all ages, individuals enjoy a high standard of health 8. Individuals are adept at relationships and social participation, and throughout life set and achieve high personal standards of their development and learning 9. There is access to varied and satisfying opportunities for work, personal creativity, and recreation
Natural Capital	10. In their extraction and use, substances taken from the earth do not exceed the environment's capacity to disperse, absorb, recycle or otherwise neutralise their harmful effects (to humans and/or the environment) 11. In their manufacture and use, artificial substances do not exceed the environment's capacity to disperse, absorb, recycle or otherwise neutralise their harmful effects (to humans and/or the environment) 12. The capacity of the environment to provide ecological system integrity, biological diversity and productivity is protected or enhanced

A lot of time has been wasted trying to define sustainability (see Chapter 4) and it is probably true that one size will never fit all. The UN, local government, a university, a household are not only different one from another, but within the sector there are multitudinous variations on opportunities and constraints for action. The top purpose of Sustainable Capitalism – as a concept or as a practical tool for thinking differently - is to enable all people to explore what sustainable development means in a practical and in a real life way by starting with their own experience.
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The sustainable capitalism approach to making sense of sustainability is compatible with the many processes and systems that are developing. It either adds value to or derives value from, for example only:

- *ISO 14001 (environment), ISO 18001 (Health and Safety) etc* [xxxvi]
- *Quality Management Systems*
- *Investors in People*
- *Life Cycle Analysis (LCA)* [xxxvii]
- *Industrial Ecology (see e.g. Graedel and Allenby, 1994)*
- *The Natural Step* [xxxviii]
- *The Eco-Compass (Fussler and James, 1996).*
- *Mass Balance Analysis (of resource moving in and out of an economic unit) (Linstead and Ekins, 2001).*
- *Design for Environment (DfE) or Sustainability (DfS)* [xxxix]
- *Community Strategy Development (for regeneration/development) (see e.g. DETR, 2000)*[xl]
- *Best Value (for local government)* [xli]
- *Community/stakeholder participation (citizen's juries, stakeholder councils)* [xlii]

It has been argued that sustainable development will struggle to be taken seriously in companies and organisations because, unlike equal opportunities, it is not backed by legislation. Which it probably never will be – not least because sustainability is actually about everything. It is not *one* of the things we need to think about. It is *the* logic within which we think about everything.

Four types of challenges – physical, political, economic and spiritual – are considered in order to explore the meaning of sustainable development further

The physical challenge

In Chapter 2 I quoted a rocket scientist who described the physics of environmental pollution, and therefore the inevitability that an increased consumption of energy and raw materials would lead to increased pollution – even if waste could be squeezed out of the system.

In order to understand the dimension of the physical challenge of sustainability it is helpful to return to what was known in the 1970s as the 'all important equation' (Holdren and Erlich, 1974) It includes the key variables for calculating the impact of human activities on the environment.

I = P x C x T

Where:	***I***	*is*	*Impact on the environment*
	P	*is*	*Population (number of people)*
	C	*is*	*Consumption of energy and materials (as manifest in the dominant economic growth indicator Gross National Product)*
	T	*is*	*the techniques or technology of that consumption*

Some 20 years later, Paul Ekins and Michael Jacobs set about solving the equation by putting in some numbers. They took the evidence from organisations like the Intergovernmental Panel on Climate Change, and from governments and scientists to conclude that if we were to achieve environmental sustainability then the impact of human activity on the environment would have to be reduced by around 50% (Ekins and Jacobs, 1995).

Into the other half of the equation Ekins and Jacobs fitted the anticipated growth in world population (at that time estimated at over 10 billion by around 2050 with 95% of the growth in poor counties (Sadik, 1991)), and what is viewed as a moderate annual growth in consumption (between 2-3%), thereby concluding that the 50% reduction in human impact on the environment could only be obtained if technologies or techniques (T) used to do that consumption made us hugely more efficient in the way we use resources. For example:

81% if economic growth took place only in the South
89% if economic growth took place only in the North
91% if economic growth took place in both North and South.

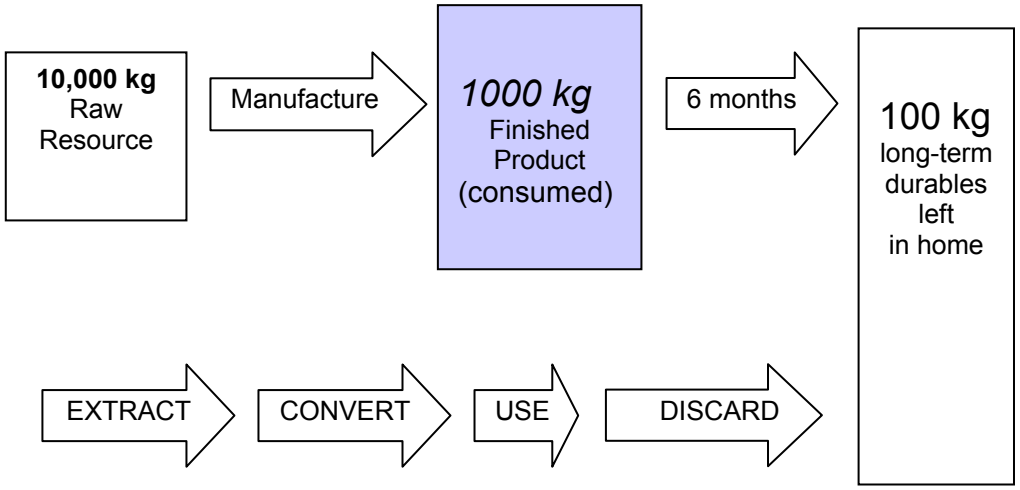
Since those calculations were done, there have been more optimistic population calculations. Current UN estimates for 2050 are 9.5 billion. And of course different results may be had by assuming different rates of growth. However, the overall difference to the equation, in relation to the magnitude of the figures, is insignificant.

Once again, what really counts about this equation is not the precision of the numbers but their orders of magnitude. A 50% reduction in environmental impact may feel about right, but an 80% to 90% efficiency improvement in how energy and raw materials are processed through the economy (as it produces and consumes goods and services) sounds out of the question! Indeed, this author wondered at the time if sustainability was in fact 'mission impossible'. Her spirits were much restored, however, after a visit to the UK Institute of Materials, where she was assured that physically a 90% improvement in resource use efficiency was not a scientific or technical problem. We are humungously wasteful in the way we use both energy and raw materials. The problem lies not in yet to be invented technologies, but in the politics and economics of change.

And true enough, from the moment that 90% figure emerged people (and governments) started trying to demolish it. Instead, it has been confirmed. It is estimated, for example, that for each 1000kg of 'stuff' consumed by an adult person living in a developed nation like Britain each year (about half of it food), another 10,000kg of 'stuff' has to be mobilised.(see e.g. Schmidt-Bleek, 1992). And while we pay across the counter for 1000kg, the bill for the other 9,000kg (water, aggregate, waste, pollution and so on) is more often picked up by the environment or by other people, sometimes out of other budgets (e.g. health), often in other countries.

Waste experts also point out that for every tonne of resource consumed as a finished product, only 100 kg is still in the household 6 months later (Biffa, 2000). A report from the Royal Commission on Environmental Pollution also makes clear that the technology exists to achieve similar improvements in the use of energy (Royal Commission on Environmental Pollution, 2000) Figure 8 illustrates the 'career' of resources through the human economy and the potential for huge efficiency gains.

FIGURE 8:BIFFA 1999 Resource Productivity



Source: Biffa (2000) *A Question of Balance,* www.biffa.co.uk

What has become known as the **Factor 10** improvement in resource productivity is now widely accepted to lie at the heart of achieving biological sustainability (Hawkins et al, 1999). How to get the same, or even more, benefit from using 10 times less energy and raw materials? Reusing and recycling are important, but the laws of physics confirm that these are pointless activities unless the amount of 'stuff' used in the first place radically diminishes. (See also previous comments on the role of biological mass and diversity.)

The challenge of creating quality of life for all people out of very small quantities of resources is a skill only recently lost by many of our species. Survival (and happiness) with limited resources is more a feature of our evolutionary history than not. And historically, humans have played a role in major ecological disruption before. What is now the Sahara was once fertile, river strewn and populated savannah. The difference now, of course, is that in our 'full up' world, there is no space to move on to as we did in the past, and no 'other place' to put the waste and pollution of our current profligacy with resources.

Where we find ourselves now has been described as the second industrial revolution; the moment when we learn to live within the energy budget of the sun, and see it as an opportunity for new and more creative and satisfying ways of living and working. For that to happen, however, the hierarchy of sustainability – that puts environmental integrity as the real bottom line – has to be accepted politically and economically.

The political challenge

There seem to be two separate analyses of what is happening to society in 'mature' democratic economies like the USA and Europe.

The first view is typified by the work of US academic, Robert Putnam who cites the decrease in participation of Americans in church, political parties, school parent teacher associations and the fall in ten-pin bowling league teams as evidence of

declining social capital (Putnam, 2000). People are becoming more individualistic, living and bowling alone because they do not belong to the same rich social networks that their parents or grandparents had. Blame for this atomisation of society is variously placed at the door of TV, the internet, lack of appropriate economic incentives, scattered communities and families, poor schooling or marginalisation of values in everyday life.

A different view comes from The John Hopkins Comparative Non-profit Sector Project team. In their latest publication Lester Salamon and his colleagues paint an alternative picture of what is happening in 'civil' society – a term used to distinguish people and communities from the state and the private business sector (Salamon and Sokolowski, 2003). While there may well be a drop of in some types of social engagement (such as bowling clubs) there is a boom in others. The John Hopkins team looked at the scope, structure, financing and role of civil society in a total of 35 countries, including the US and the UK, to conclude that "in addition to its social and political importance the civil society sector turns out to be a considerable economic force."

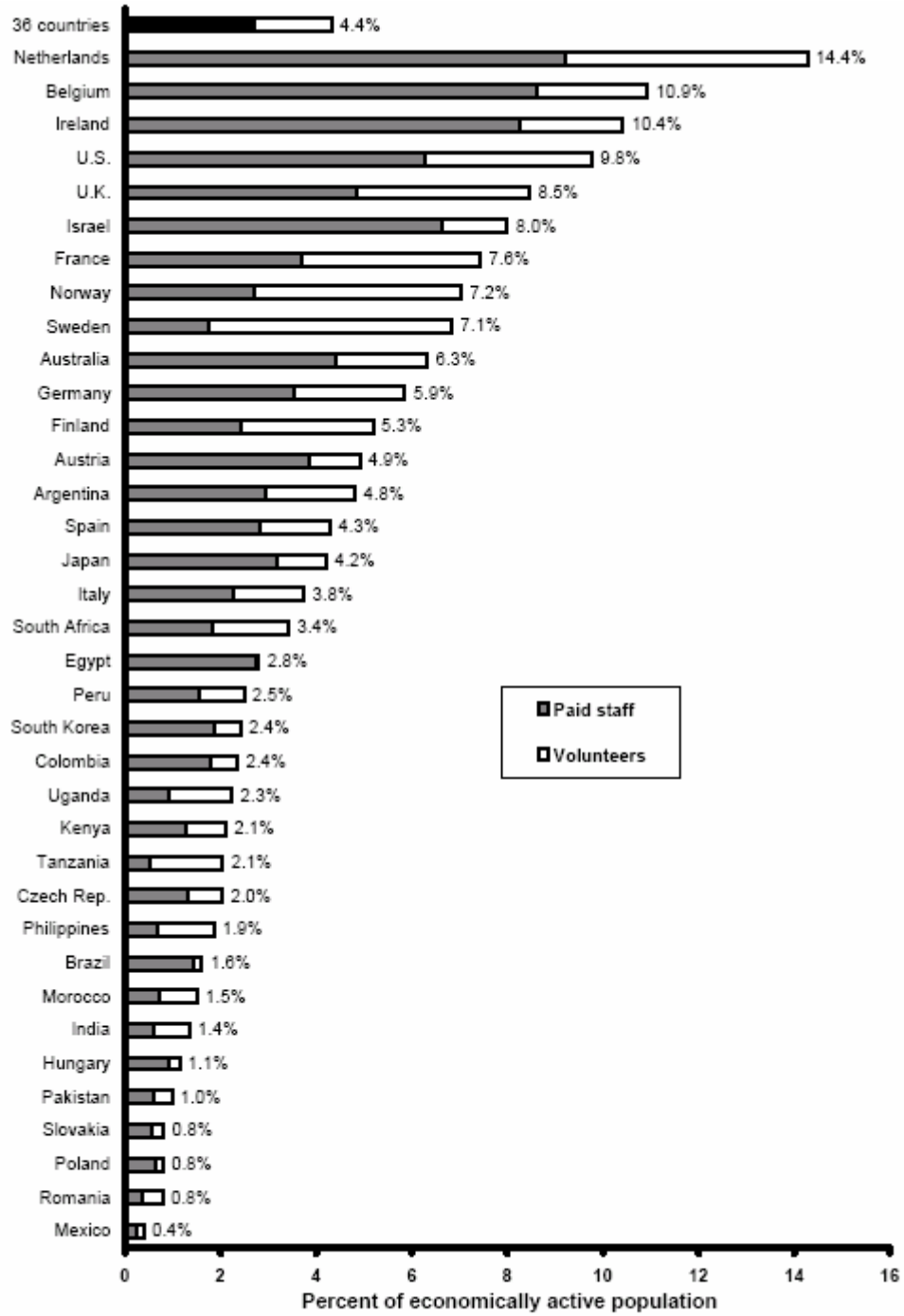
Table 2, the scale of non-profit activity, 35 countries, 1995-1998, shows the remarkable scope of that non-profit activity, which, if it had geographical boundaries like a country, would be entitled to a seat at the G8 meeting of the worlds richest countries, or, if it were a corporation sector would entitle it, as the world's biggest employer, to a view on employment related legislation and other matters.

TABLE 2: The scale of non-profit activity, 35 countries, 1995-1998

- $1.3 trillion expenditures
  - 5.1% of combined GNP
  - equivalent to seventh largest 'country' in the world [xliii]
- 39.5 million FTE workforce (21.8 million paid, 12.6 million FTE volunteer)
  - 4.4% economically active population
  - 46% of public sector employment
  - 10 times the employment in the utilities and textile industries in these countries
- 190 million people informally volunteering (includes many
  - 221 volunteers per 1,000 adult population (over 20%)

Of course, the overall figures mask considerable disparities between countries, but, as Figure 9 shows, civil society organisation workforce as share of economically active population, by country, (Salamon and Sokolowski, 2003: 4), the picture, even in the US, is more positive than that painted by Robert Putnam.

Figure 9:
Civil society organisation workforce as share of economically active population, by country



SOURCE: Johns Hopkins Comparative Nonprofit Sector Project

Paradoxically, the decline of engagement in social activities noted by Robert Putnam could be ascribed to the fact that his analysis was derived from statistics that are no more than surface noise when compared to the deep shifting of the tectonic plates of the relationship between the state and the private and civic sectors. In fact, most social scientists writing and talking about social capital in recent years seem to be missing the bigger – and deeper - story to be had by taking a more holistic view.

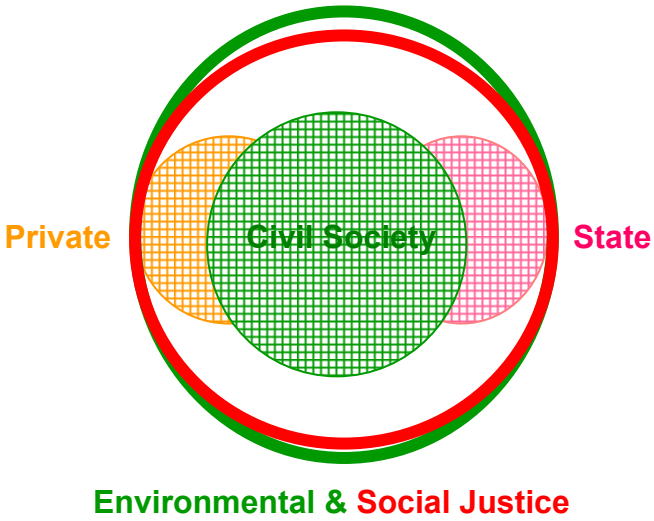
Social capital is not a new phenomenon. Building it and living off its interest is what people do, and have done, all over the world and since forever. It is even, as discussed earlier, likely that there is an intimate relationship between the development of our big brains and the human species survival strategy of evolving complex inter-relationships with our environment and each other. Keeping all these relationships in good shape requires an enormous amount of *nous* (common sense, gumption) at one level, and wisdom (good judgement based on a combining experience over time with up to date knowledge) at another. To understand better what is involved, read any good anthropological study of African kinship systems. What still survives in some parts of Africa is how it used to be in Europe. Indeed, some African academics and commentators remain irritated by the failure of developed country 'development experts' to understand the indivisibility of social, economic and environmental systems as far as most Africans are concerned.

They point out that the persistence of many aid programmes in disaggregating the three is actively damaging traditional social relationships, including those with the local environment (Ibeanu, 2004). This is not a plea to return to some romantic misconception about a golden past, simply a suggestion that some sort of 'reverse' development programme might be appropriate – whereby the rich countries re-learn social organisation and environmental relationship *skills* that have been marginalised if not forgotten along the modern economic development pathway.

But to return to the really big narrative that is unfolding at the moment. That is that while the civil society sector and the participation of people in all sorts of not-for-profit and voluntary activity do seem to be growing, so their participation in holding the state and the publicly quoted private sector is dropping. Critical lines of accountability (voting and shareholding) are being weakened.

Figure 10 (Civil Society grows while support for State and Private Sector falls) shows diagrammatically what is happening. Significantly, a key element of what is inspiring the growth of civil society activity is people's concern for environmental and social justice – the very things that are excluded from government's and business's definitions of success.

FIGURE 10: Civil Society grows while support for State and Private Sector falls



A UK Electoral Commission Fact sheet on turnout at elections noted "Declining turnout in UK elections should be seen in the context of similar patterns amongst most established democracies in the world". Some commentators have diagnosed sharp downturns in voting as a 'turnout time-bomb', a view based on the high percentage of non-participation amongst, black and ethnic minority communities, unskilled or long-time benefit receivers, and particularly young people[xliv].

As government can no longer claim to hold the quality standard of being 'of the people, by the people, for the people' through the ballot box it has to seek legitimacy through a series of non-reflective responses to public polls and the view of focus groups on a range of single issues. It is hard enough to make and deliver good public policy as it is, never mind get it coherent and consistent between government departments, so the additional handicap of endlessly having to respond to the moving territory of snap-shots of public opinion show a leadership behaving more like a cork in a storm than a wisely-crewed ship of state.

A poll conducted by the World Economic Forum in 60 counties before its annual meeting in Davos in January 2005 underlined the disillusionment of people with their governments – and with business. So shaken were governments by the result that part of the meeting was held openly and 'on the record' rather than behind closed doors. According to the press, however, a high level of cynicism reigns in the commitment made at the meeting with regard to poverty (in particular Africa) and climate change. High level support for reducing the widening gap between rich and poor (President Chirac of France pointed out that the ratio between least developed and OECD countries which was 1:30 in 1980 is now 1:80) and other debt relief or development aid programmes has too often not been translated into money on the ground. [xlv]

A similar disengagement of individuals from the system at the heart of financial wealth creation – the stock market – is also underway. Since 1963 the percent of total shareholding by individuals has dropped from 54% to 15%, while that of insurance companies (from 10% to 17%), pension funds (from 6% to 16%), and

other financial institutions (from 1% in 1989 to 11%) has risen (National Statistics, 2004). Non-UK ownership of UK shares rose from 7% to 32% over the same period. Overall, at the end of 2003 individuals accounted for only 20% of all shareholdings with a total value of £1,368 billion.

A study by Cranfield School of Management also reveals a sharp decline in the number of fully listed companies on the London Stock Market, from nearly 1,600 in 1997 to only 910 at the end of 2003. Similar losses of quoted companies are noted in New York, Paris and Frankfurt. Some of the increase in drop-outs compared to joiners can be explained by the disproportionate effort and cost of meeting stock market regulatory requirements and communicating with the analysts and fund managers – especially for smaller companies which may move to the 'junior' more lightly regulated listings like the Alternative Investment Market (AIM) (Dorman, 2004). But there are other reasons why companies are being set up or taken back to private ownership. The market itself can move up and down independently of the success or failure of an individual company – fine on an upswing but demotivating for both entrepreneurs and share-owning staff when there is a downswing that unfairly affects the price of their own stock – and the reputation of the business. Richard Branson and Andrew Lloyd Webber both floated their businesses and then took them back into private ownership – largely to regain control of their own destiny. Also, low interest rates and a growing and active venture-capital sector make other routes to financing development or expansion more attractive. [xlvi]

Furthermore, Marjorie Kelly analysed the American approach to capitalism and found that the (modern) assumption that maximising short-term return to stockholders is the primary purpose of the corporation actually drained capital out of it. In 1999 she noted new stock sold to be $106 billion with traded stock valued at $20.4 trillion. Adjust the latter figure for stock buy backs, dividends to shareholders and so on, and it emerges that, since 1981 the net result for new equity issues was a *negative* $540 billion. In other words stockholders 'investing' in the market extract enormously more than they invest. Could this be part of the reason that individuals are moving out of investing in the stock markets? They know, either through research or instinct, that it's a mug's game? Companies that didn't, or were unable to buy back their stock, like the Body Shop, have had to radically change their operations to meet, not the environmental and social goals that made them financially successful in the first place, but the exigencies of the stock market which has forced the company to prioritise short-term returns to shareholders over all else (Kelly, 2001).

So what does this rise in not-for-profit organisations, volunteering and personal generosity amongst ordinary people, combined with their disengagement from trust in and respect for both the state and the business sector mean for sustainability?

First, this is not a new situation. MORI have polled on this issue over the past 20 years and while some ground has been made by business leaders and government Ministers they remain firmly in the bottom scoring league (See Figure 11: Who do you trust?)

FIGURE 11: Who do you trust?
Now I will read you a list of different types of people. For each would you tell me if you generally trust them to tell the truth, or not?

	1983 %	2003 %	
Doctors	82	91	
TV News Readers	63	66	
Police	61	64	Selection from top scores
The ordinary man/woman in the street	57	53	
Business leaders	25	28	The bottom four scores
Journalists	19	18	
Politicians generally	18	18	
Government ministers	16	20	

Base: C. 2,000 British Adults Aged 15+
Source: 1983-2003, MORI/BMA

To understand the political implications for us right now it might be worth recalling events during the 1980s in east Europe. Intriguingly the constitutions of several former communist countries contained an obligation on citizens to protect the environment. At the same time, however, it was illegal for people to assemble, make copies of documents. Most of the democratic movements in East Germany, Poland and Czechoslovakia had their roots in environmental and similar societies, although exercising their constitutional duty often led to imprisonment. (See Parkin, 1990)

Then came glasnost and perestroika and a visit of Michael Gorbachev, then President of Russia, to Berlin to celebrate the 1989 40th anniversary of the founding of the East German state. Seen on news bulletins around the world, was the moment when Gorbachev left his entourage during a walkabout. He strode into the crowd shaking hands. What the TV crews did not pick up was his words: "If you want democracy take it now. If you want democracy, take it now." This message, the crowd took (correctly) to mean that should East Germans rise against their government, Gorbachev would do his best not to roll soviet tanks over them (as he had done to previous risings in Prague in 1968 for example). The word spread like wildfire through the already highly effective networks of dissidents. The 'velvet revolution' followed very quickly. Gorbachev had removed the last barrier to change.

But it only worked because the citizens of East Germany had posed and answered a key question for themselves: "Is the fact that the snow is falling black, that male life expectancy is dropping, that we have to queue for days for light bulbs, that our food is limited in choice, low quality and in short supply, that our teeth are rotten, that we don't get paid for months on end – is all this happening because government intends it to happen, or because government is powerless to stop it?" A highly educated

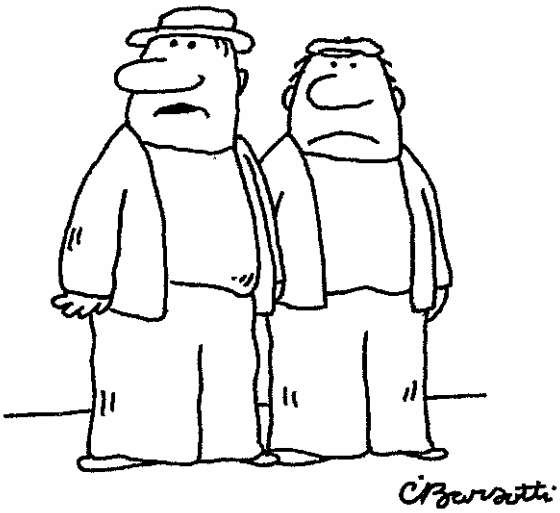
population came to the conclusion that the last answer was the right one. A revolution against communism it may have appeared, but the candlelight processions, the breaching of the Berlin Wall and the transition to democracy were also the logical next steps to take as the old logic was seen to be failing to deliver in its own terms.

We know the triumphalism of commentators in 1990 did a lot to alienate many people around the world. An editorial in the 1990 *Economist Magazine Review of the Year* trumpeted *How the West has Won*, for example. Amends could be made by openly and honestly learning the lessons from what happened in the last decade of communism and applying them to the current situation. If trust in government and business is so low, and if social and environmental justice are proving to be a uniting force for civil society, then another 'velvet revolution' may be due. And taking a new and widened idea of what capitalism might be could just be the logical next steps to take over the next decade as the western logic, like communism, goes on failing to deliver in its own terms as well.

The economic challenge

"Nature, when she formed man for society, endowed him with an original desire to please, and an original aversion to offend his brethren. She taught him to feel pleasure in their favourable, and pain in their unfavourable regard."

So opined Adam Smith in *Theory of Moral Sentiment*, which he published in 1759, as part of his lifelong exploration of a question raised by one of his teachers and inspirations, Francis Hutcheson. From the perspective of moral philosophical debate in the 18th century Hutcheson anticipated research by 21st century 'economics of happiness' academics by suggesting that "from the very frame of our nature we are determined to perceive pleasure in the practice of virtue, and to approve of it when practised by ourselves or others." (Quoted in Herman, 2001) Although most of Adam Smith's work demonstrated that he clearly agreed with Hutcheson, his own legacy is his vision of a marketplace free from government meddling and operating like an 'invisible hand' guiding right behaviour. It has been over-simplified certainly, and subsequently mutated into today's model of the self-interested individual economic actor operating in a value-free marketplace; a model pared of context and therefore blind to huge inequality of wealth and various social opportunities, and not concerned with effective social control over the ecological side effects of economic activity itself.



"There, there it is again—the invisible hand of the marketplace giving us the finger."

Source: Layard, Richard (2005), *Happiness: Lessons from a New Science*, New York, Penguin Press

Looking back to the time Adam Smith was writing and seeing the world around him through his eyes would have revealed that the economy he saw at work – in his native Edinburgh or internationally – probably resembled more the sort of economic activity we would call today 'grey'. Not quite black and illegal, but certainly 'informal', that is not completely hooked into the now legislatively enshrined formal relationships between employer, employee and taxing authorities, and certainly not troubled by the ecological concerns of the 20th century. Just one year before Adam Smith published the *Wealth of Nations* in 1776, Greenock born engineer James Watt and the Birmingham entrepreneur Matthew Bolton formed the partnership that would develop the steam engine into a means of supplying power to all types of industry. And although concerns about poor working conditions of the 'assembly lines' in factories were important to Smith two decades before the industrial revolution got into full swing – there is no evidence he saw constraints to his economic and social theories from an environment struggling to provide either raw materials or the capacity to mop up the consequences of burning unprecedented volumes of coal. Although interest in botany and the natural world grew during the 17th and 18th Century, the first act of Parliament was not until 1869 and then inspired by the need to protect birds from the massive demand for their feathers for the hats of European women. And on pollution, the famous Alkali Act of 1863 was the first to "do something about the protection of the air against pollution by noxious vapours." (See McCormick, 1989).

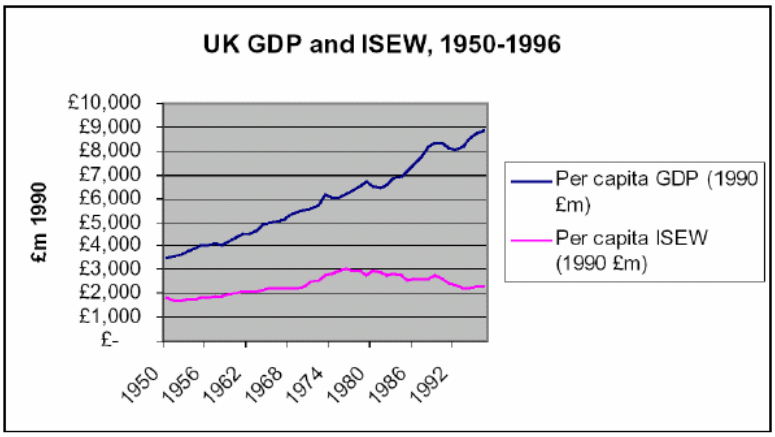
Constraints on the Smith inspired notion of capitalism have become more evident not only as human population has risen in absolute numbers but also as the demand placed on environmental resources and services has disproportionately (between rich and poor) rocketed. The first UN Earth Summit called to address what was then seen as an impending collision of human aspirations and the environment in 1972 looked at an 11 foot high pile of evidence. Twenty years later the second UN conference in Rio de Janeiro in 1992 looked at an incalculably huge pile of electronic and paper evidence, with not one significant step taken to adjust globally accepted economic policy 'norms'. On the sidelines however, the OECD, for example, has

begun to reframe the idea of a "New Economy" (OECD, 2003). The environment or natural capital does not figure in this new analysis of economic growth - so far. And beating strongly at its heart is still the central role of financial capital and the yet to be realised technological opportunities (such as biological, nano, and information and communication technologies). But firmly on the OECD scene as an essential actor on the economic stage is human capital, in particular the importance of investment in education.

Other examples of how social and manufactured capital are entering the widening definition of capital can be found in more progressive organisations and governments than the collective view provided by the OECD. For example, few governments any longer deny that investing properly in vibrant, attractive and well connected local communities is linked to reducing crime, ill health, and other things that enter the cost side of the national accounts. Or that enjoying the benefits of a rail network that is on time, comfortable and safe depends on investment in the stock of infrastructure (rails, trains etc) on which that service depends.

New approaches to measuring welfare in the broader sense are now showing that the prime indicator of economic success (Gross Domestic Product) is little linked to well being. (The word 'wealth' did once mean well-being. This now archaic dictionary definition has been replaced by wealth as meaning rich in money and possessions.) As well as the work on the economics of happiness discussed in Chapter 1, organisations like the New Economics Foundation have built on the start made by Daly and Cobb in the US to develop a UK Index of Sustainable Economic Welfare (ISEW). GDP is recalculated after adjustment for things like income inequality, unpaid domestic labour, environmental degradation, depletion of natural resources, long term environmental damages and so on, to plot a similar trajectory for per capital well being against GDP as the happiness graph (see Figure 12: UK Index of Sustainable Economic Welfare and GDP per capita 1950-1996 from NEF 1997) The ISEW index is, in fact, much closer to what people feel to be true about their lives, than are the traditional Treasury indicators.

Figure 12: UK Index of Sustainable Economic Welfare and GDP per capita 1950-1996



Source: Donovan Nick, David Halpern and David Sargeant (2002) *Life Satisfaction: the state of knowledge and implications for government*, December http://www.wcfia.harvard.edu/conferences/socialcapital/Happiness%20Readings/DonovanHalpern.pdf

Scaling up to international level, the evidence from the UN Development Programme (2004) and the UN Environment Programme (2002)[xlvii] grows the social and the environmental case for sustainability as well as the possibility of introducing other variables to the calculations surrounding economic progress. It is easy to be cynical about government responses at the World Economic Forum, but it is also possible to see positive steps, albeit hesitant and too slow for comfort, in the direction of sustainable capitalism.

As well as uncomfortable opinion polls, heads of states and global corporations will also be considering whether the withdrawal of individuals from shareholding is significant to their business. The concentration of shareholding in a few major investors (e.g. pension funds) does have advantages. One of them is a more cosy relationship at AGM time and easier dialogue in between with everyone talking the same language. On the other hand, many big investors are on 'tracker' mechanisms which trigger buy and sell options in relation to the movement of share prices or other indicators. As already discussing this cramps the style of many companies. As does another trend, that of the move of investors into businesses that adhere to ethical (social and environmental) criteria. The total amount invested is in relation to total investment still modest, but it has grown significantly and swiftly over recent years and is just one example of how time could be running out for businesses that don't bring their activities into line with ecological and, increasingly, social constraints and aspirations. It is estimated that consumption of goods that meet similar standards rose to £25 billion in 2003[xlviii].

And, in an interesting new development, private investors are clubbing together to direct their financial capital more precisely towards initiatives that will help create the future markets for low carbon goods and services. For example, former US Vice President Al Gore has joined forces with David Blood, a previous chief executive at Goldman Sachs Asset Management to create a new London-based firm called Generation Investment Management, in order, Gore says, to "serve people who want to integrate sustainable returns with traditional equity analysis"[xlix]. And the CEO of what is effectively a mission-driven merchant bank Climate Change Capital recently helped launch The London Climate Change Service Providers Group of 70 companies offering service related to tackling climate change with a direct challenge to business lobby groups like the CBI which are actively campaigning against environmental regulation. [l]

A great deal of activity is taking place in economic theory right now. In his exploration into *The Nature and Logic of Capitalism*, Robert Heilbroner concludes: "Over the longer run, then, it still seems probable that the more successful capitalisms of tomorrow will be those that address the difficulties of the present period – its helplessness against the internationalisation of capital, its propensity to inflation, its extreme social and ecological vulnerability to technological disruptions – by new structures that utilize the state in various ways to cope with these problems as best they can be managed within a regime of capital." (Heilbroner, 1986) And it could be that the European birthplace of the current model of capitalism that dominates the world may not be the first place to adopt a wider definition that integrates environmental and human goals and constraints into the calculations that determine progress and success. China is well aware that its levels of traditionally measured economic growth are not sustainable – in social as well as environmental

terms. It is perhaps the first country to say it plans to slow its economic growth.[li] And as Kenneth Rogoff, former IMF chief economist pointed out at the World Economic Forum in January 2005, the biggest debt relief programme is being provided by China in financing the vast US balance of payments deficits. As well as shifting tectonic plates of relationships between state, business and civil society, it could be that a new balance of global political and economic power amongst states may be developing too.

There is enough evidence that a new approach to the economy is struggling to emerge. But the rate of environmental and social degradation suggests that some high powered midwives are needed to bring it into mainstream economic thinking pretty quickly. People like Nicholas Georgescu-Roegen, Herman Daly and a host of colleagues have done an enormous amount of preparatory work to underpin a widening idea of capital as a way of reforming our economic systems. Paul Ekins' most recent publication *Economic Growth and Environmental Sustainability* (2000) has an excellent bibliography and is in its own right a seminal book for economists and amateurs alike.

Paradoxically (because it is not yet included in economic analysis like human capital considerations like education) there are now quite a lot of measurements relating to environmental impact. The UK government, for example, publishes a calculator so people can translate their energy consumption or transport choice into tonnes of carbon emitted[lii]. And a lot of work has been done, as Paul Ekins describes, on the role of taxation in contributing to the 'internalisation' of environmental costs into the national or corporate balance sheet. Sustainability Accounting is now a discipline in its own right, though it too focuses predominantly on environmental costs and benefits. [liii] Developing a similar suite of measurements for human and social capital is lagging behind but catching up fast. The World Resources Institute has devoted its 2002 – 2004 Report to governance, democracy and citizen participation, for example. (UNDP et al, 2003)

The spiritual challenge

*"The general notions about human understanding … which are illustrated by discoveries in atomic physics are not in the nature of things wholly unfamiliar, wholly unheard of, or new. Even in our own culture they have a history, and in Buddhist and Hindu thought a more considerable and central place."(*Oppenheimer, 1954: 8-9)

Mention the human spirit and very few people bristle. Most relax with relief that it is an OK topic for conversation. Those alert to the debate raging between the 'creationists' (God invented the Earth about 6,000 years ago), and the evolutionary biologists (all species emerged from the same primeval swamp some 4 billion years ago) will also know that for most people in the world their spiritual or philosophical heritage stems from a belief in the indivisibility of mind, spirit and the physical world, and their icons and stories are variously successful (and often highly political) attempts to make the ineffable real for large numbers of people. Although it is only very recently that we understood in a *scientific* way that the same organic materials and energy contribute to human bodies as contribute to all life on Earth, spiritually, instinctively, and through practical observation we have known it for a very long time. Awe at how nature can grow seasonally highly complex plants and animals (that

don't even have roots into the soil!) underpinned many rituals in many cultures, and still holds mysteries even for modern stellar scientists. Modern religions have picked up on the experiential learning of generations (e.g. the 'earth to earth, dust to dust' invocation of Christian burial service – until the advent of modern herbicides, and slow to biodegrade coffins, everyone knew that the best mushrooms grew in the graveyard!

Whatever your religious affiliation and belief, it is surely comforting to know that we are part of the Earth and not some guest or invader, here only on sufferance. This planet is our home, it is where we come from, and it is where we belong.

A turning point in my thinking about all this was Fritjof Capra's influential *The Turning Point*. For me, as someone 'exposed' in early life to Scottish Presbyterianism and all its joylessness, to read about the physicists engaged in subatomic research and their discovery (en route to creating the atom bomb) that the sub-atomic world consisted largely of space, with the sub-particles appearing sometimes as matter, sometimes as waves, depending on how they were observed. The world was not a heap of nuts and bolts after all, but a dynamic set of relationships in which human beings played an active part. Another nuclear physicist, James Jeans, said "the universe begins to look more like a great thought than like a great machine." (Quoted in Capra, 1982; see also Parkin, 1991).

So, biologically and even sub-atomically, I and other members of my species are intimately involved in this evolutionary adventure that is planet Earth. Intellectually and politically, however, we seem hell-bent in writing ourselves out of the script. Whatever our religion or spiritual hinterland, there is not, as yet, an intellectual or political majority for re-adjusting the course of human development in a more sustainable direction. Government's and society's responses to the evidence from climate scientists remain incommensurate to its implications.

This paper, however, does represent a growing interest in crafting a new direction for the human evolutionary endeavour – one that ends the cognitive dissonance whereby right now the things we have to say and do to be in the mainstream of thought or to be elected to public office, or to rise to a leadership role in business are different from the things we have to say and do to address the major challenges of unsustainable development.

And even if all this talk of spirituality sits uncomfortably with the reader, I would be surprised if some very basic scientific reading about the biology, chemistry, and physics of the way our bodies and the rest of life on Earth works didn't stimulate spiritual reflection more than it would dampen it. And even if that reader remains spiritually untouched, at least such knowledge would enable the reader to make decisions and choices - at work or at home – in the light of the laws of biology and physics rather than in ignorant breach of them.

There are those that subscribe to the philosophy of Deep Ecology that replaces people as the centrepiece of thinking with nature. Perhaps the best known is Arne Naess (see e.g., Naess, 1973). Proponents of Deep Ecology, at their most extreme can appear to actively dislike their own species. Generally speaking, however, this approach was and is helpful in reminding people disconnected intellectually and

spiritually from nature that it, as opposed to the shopping mall, is the only source of life. Important though that understanding may be, *implementing* sustainable development is definitely a human centred project. Nature is quite good at sustainability if left to it – it has been working at it for long enough to a level of sophistication that is still beyond our comprehension. It is we humans who need to change our way of doing things – and for that we need to learn to love and respect as well as understand our place in the great evolutionary adventure that is life on Earth.

"*The existence of God matters less that what we do in the name of creation*"

7. REFLECTIONS FROM THE BOILER ROOM OF CHANGE

"Worldviews are hypotheses under development" (Berthold Brecht)

In the UK, the Prime Minister himself chairs the Cabinet Office group responsible for 'modernising' government. This is a challenge not to be underestimated, as the structures and mechanisms of government in the UK are largely the same as they were when the UK Prime Minister could comfortably disappear to the grouse moors of Scotland for three months in the summer. Government functions through separate Departments of State, each with a range of departments and a suite of Ministers with a carefully delineated range of responsibilities. A single minister from each department is designated 'the Green Minister' and expected to liaise with their counterparts in other departments. This is an administrative model that is more or less echoed in other governments and international organisations. The UN and its offspring like the World Bank, the International Monetary Fund (IMF) and the World Trade Organisation (WTO), for example, were designed 60 years ago. So no wonder having to deal with a new boundary intolerant logic such as sustainable development has proved so difficult. An issue that marauders not only across the responsibilities of every minister but also intrudes into every corner of their portfolio is an administrative, not to mention a political, nightmare!

The final chapter of this paper takes as given that the structures and mechanisms of state and international relationships will change, but too slowly to tackle the key challenges of the next couple of decades. Governance is on the agenda of government and supranational organisations like the UN and the EU, which is great, but in the meantime, we have to implement sustainable development despite unfavourable structures and mechanisms. Wherever possible and pushing the boundaries of institutional habits wherever necessary, people and organisations must start immediately to DO things that contribute positively to sustainable development. Professor Mike Clarke has called this approach 'adaptive management'. It is a technique familiar to those with expertise in organisational change. Do the right thing, and bring others along with you. After all, unsustainable development has not resulted out of collective or even individual badness. It is the result of an aggregate of unknowingly wrong decisions and actions. By deduction, therefore, sustainable development should come about through an aggregate of knowingly right decisions and actions.

Yet, inexplicably and despite the pumping up of rhetoric around climate change and the plight of Africa for the UK Labour government's Presidency of the G8 and the EU in 2005, the UK government's preparations for a General Election in the same year do not have the environment as a key campaigning issue.

Or is it inexplicable? Why is there what Kofi Annan, Secretary General of the UN calls a "crisis of implementation" when it comes to sustainable development? Geographer Jared Diamond tries to find an explanation through his study of past societies. Are there any common features that led them to succeed or collapse from which we might draw lessons for today? (Diamond, 2005, *Collapse: how societies choose to fail or succeed*, Viking, New York) He offers a five-point framework of types of factors to be considered:

I. Damage people inflict on their environment
II. Climate change
III. Hostile neighbours
IV. Decreased support from friendly neighbours (e.g. trading partners)
V. The response of society to its problems

The role of the first four types of factors is relatively easy to understand. More baffling is the last. Why does group decision-making on the part of whole societies so often fail? Diamond offers an interesting "road map of factors contributing to failures of group decision-making". They are clustered into a "fuzzily delineated sequence of four categories", and the book gives examples of each.

1. A group may fail to anticipate a problem before it actually arrives. For example,
    - the introduction of rabbits into Australia
    - reasoning from false analogy as the French did in imagining the Second World War would be like the first.
2. When the problem does arise, the group may fail to perceive it. For example:
    - acknowledging the climate change trend against a background of fluctuations
    - not noticing slow incremental change ('creeping normalcy' or 'landscape amnesia')
    - the problem is invisible until too late – e.g. soil nutrient exhaustion
    - distant managers are isolated from or unaware of on the ground problems
3. After they perceive it, the group may fail even to try to solve it. There are two main clusters of examples of why this should be:
    - The maintenance of the problem is good for some people so:
        - 'rational behaviour' as recognised by economists or social scientists (as 'correct reasoning') tends to 'win' over moral or otherwise right reasoning, say, fishing or logging policy and practice
        - minorities have disproportionate power in a democracy as with, say, US senate or Israel compared to the Netherlands
        - the 'tragedy of the commons' syndrome (if I don't do it someone else will)
        - there is no interest for the decision-making 'elite' in solving the problem; they may even see a threat to their power in doing so.

- decision-makers are able to insulate themselves from the problem (e.g. gated communities, distant castles)

- The problem is bad for everyone but:
  - 'irrational behaviour' happens due to a clash of values. We may cling to policies, or be 'persistent in error' because of some deeply held but maybe no longer appropriate value.
  - There is felt to be a 'sunk cost' - an investment in a policy, a point of view or even a stock. We lose face publicly (or to ourselves) by changing.
  - Admirable values in one context may be damaging in another (the context being time or place). For example, Australia is adapting its 'Britishness' to fit with its geographical closeness to Asia, but rich country sponsored development programmes in Africa still ignore and so destroy the local holistic approach to the way people and the environment live together.

4. They may try to solve the problem but may not succeed." For example:
   - Introducing inappropriate solutions, such as attempting to establish long lasting farming societies in an environment hostile to farming (US, South America, Africa); or introducing alien species into an ecology that has evolved without them (rabbits into Australia, Leafy Spurge in Montana)
   - Ignoring local wisdom – about the local environment, or about suitable technologies and customs

It has been worth distilling some of the conclusions of this timely and readable book because we are fairly and squarely at stage three of Diamond's route map. Because it is there that current national and world leadership seems to be thoroughly stuck it is unfortunate that he spends disproportionately little time examining how leadership groups can make good decisions. Diamond does illustrate his point by comparing President Kennedy's approach to decision-making around the Bay of Pigs invitation with that of the Cuban Missile Crisis, but didn't raise his road-mapping for success to the same sweeping level (or number of pages) as his analysis of the fall of Mayan civilisation or Easter Island.

In a lecture on his book at the Royal Society in London in January 2005, however, Diamond summarised his advice to world leaders:

1. Take environment and population seriously

2. Examine critically the role of any 'elite' in power. Can they insulate themselves from the consequences of their decision-making? What is there to be learnt from societies that have successfully solved problems?
3. Reappraise the values that are driving the status quo. Which are right for today? Which are not? Are the assumptions on which today's societies and economies are built still valid?

To which I would add one more:

4. Offer a believable vision of how things will be in the future. Without a practically achievable vision - a common purpose - around which to gather the efforts of leaders and people, change will not pick up the sort of speed it needs to. Leaders need to take followers with them, so a shared belief in an achievable (though not necessarily pain free) future is a key ingredient.

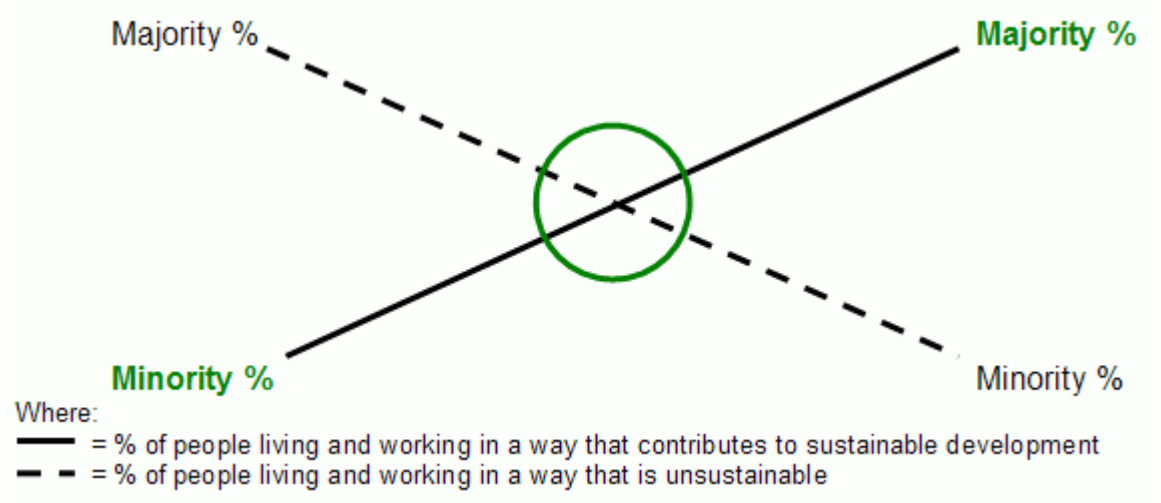
We have moved rapidly from ignoring the problem to perceiving it, and can't afford to dilly dally on Diamond's Step Three (which is where the UK Labour government is floundering at the moment). The challenge is to learn from the past - and the present - and move quickly to Step Four: solving the problem - but successfully.

This paper is arguing that the only logical and intellectually coherent framework within which people can make sense of what to do next is sustainable development and its companion reconfiguration of capitalism to properly integrate the environment and people. Indeed, the hinterland of writing, advocacy and evidence around the sort of policies and new practice that would constitute sustainable development is becoming as voluminous as the evidence around climate change. Certainly at the moment there seems no other believable counterpoint to the extremists and their call to arms of the hopeless and desperate.

The only remaining question is how long it takes to engage fully onto a path for human development that has the capacity to continue into the long term. Environmental evidence suggests we must do this within the next 10 -15 years. What do we have to have achieved in that time, and how will we know we are on the right path?

Waiting for a simultaneous collective change is, for reasons of institutional inertia and dysfunctional group decision-making already mentioned, not wise. So this chapter explores the sort of change that can happen – and very often is happening *despite* an inhospitable context. Again the headings and topics are not a definitive list or blueprint; rather a convenient way of clustering the sort of thinking and activities that make me optimistic that sustainable development is not only a realistic proposition, but also starting to happen. The climb up the solid line in Figure 13 may be steep, and the effort needed to keep going will be significant.

FIGURE 13
The 'tipping' or cross-over point: When sustainable development is no longer extraordinary behaviour, but is viewed as normal behaviour.



Adaptive Management: change despite the barriers

Nature is changing all the time. Evolution is one big change management process, laissez-faire and organic at one level, but with an overarching order that inspires. Success (which in ecological terms equals resilience over time) is the result of, and measured by, the strength and multiplicity of relationships. Therefore, individual evolutionary success depends massively on collaboration with other species. Break too many relationships and you end up in an evolutionary cul-de-sac or, worse, get snuffed out.

The same principle – the networked resilience of a system, and therefore its capacity to survive shocks and set backs – applies to social and economic systems. As a mammal highly dependent on a narrow range of environmental conditions for survival, we have evolved able to manage a complex range of relationships with our environment, with other species and with each other as part of our evolutionary strategy. Management guru, Peter Senge, uses nature's approach to organisational management to argue that businesses work best if run as living and learning organisms rather than like machines. (Senge, 1990; and Geus, 1997).

Modern politics takes the individual or at best the 'household' as the key economic unit, but as a result of planners breaking up communities and re-organising neighbourhoods *physically*, in ignorance of all the social and cultural intertwining between different parts of it, we have learnt that social resilience is genetically and geographically located beyond the household. Communities (and families) can and do become oppressive and narrow in their outlook, so it is important not to become over-romantic about small community life. Which is why the longer relationship lines with other communities near and far, and with the environment, and with ideas, are part and parcel of keeping the social 'genetic code' of any group healthy. It needs to be refreshed and renewed through grasping opportunities, building new relationships and innovating, but without losing sight of its original purpose (human satisfaction and happiness?). Recent work showing the power of 'networking' to drive change

can help developed societies re-learn the importance of inter-connected social groups to the 'ecology' of human and organisational interaction. Working with continually shifting multi-level relationships sits uncomfortably with the current command and control approach to political or organisational leadership. The Prime Minister's huge emphasis on leadership training is in part in recognition that there seem to be relatively few people with the wisdom and experience to set inspirational directions and goals and then leave others to move forward through a more organic (and therefore creative?) approach to innovation and organisation. [liv]

Thinking about problems and their resolution in the wider context of ensuring investment in *all* five types of capital stock, can bring *reasonable* confidence that decisions are likely to be moving in a direction that favours sustainability rather than the opposite. It is not enough to say for example, "I am investing in education; *ergo* I am contributing to sustainable development". It is only by demonstrating that the investment is in the sort of education that builds a sustainability literate citizenry and in its execution does not damage any other sort of capital that it is genuinely contributing.

A key word in the last paragraph is *reasonable*. The obsession with detailed numerical targets and measures is eclipsing the need to build the confidence of ALL people that they have *sufficient* knowledge to make *good enough* decision that will contribute positively to sustainable development. Muddled messages and high voltage banks of indicators and statistics are dazzling people who, like rabbits in front of headlights, are paralysed by uncertainty about what to do for the best.

Adaptive management does not mean that all players will make the right decision, but by and large, and equipped with some straightforward tools and information, it could mean that, as it is with evolution, the majority will be moving towards sustainable development. And that is good enough, with only the usual caveat. That is that we have to change direction in the evolutionary equivalent of a nano-second, which means within the next couple of decades.

So a few pre-emptive strikes are in order. This chapter continues by suggesting a few, and ends by exploring in more detail two hugely important changes that merit examination on their own – one a consideration of how sustainability 'literacy' might join the canon of 21st century literacies, and, closely connected to that, how we can rekindle reverence for the environment and for each other.

Pre-emptive strikes: this decade's 'to do' list

As well as major on-going programmes to build a sustainability literate society, and stimulating and maintaining an open and constructive debate about what values matter as we move in a sustainable direction, there are four areas where urgent and pre-emptive (i.e. not waiting for group decision-making) strikes can be made.

1. Building biological mass (investing in the supply side of environmental services)
2. Re-defining security
3. Shaping future markets now
4. Re-knitting social fabric

1. Building biological mass

Expressed in the simplest way, *unsustainable* development occurs when the demands of people on the goods and services of the environment outstrip its capacity to supply them. Climate change is a powerful signal from the biological world that already it is unable to soak up the emissions from human activity, in particular the burning of fossil fuel. Despite the disproportionate air time given to a tiny number of what Sir John Lawton, Chief Executive of the Natural Environment Research Council in the UK calls 'flat earthers', an overwhelming scientific consensus has developed amongst government, academic and independent scientists and now governments. Evidence has now started to fit the predictive computer models[lv]. Even the American Senate now acknowledges that the 0.6° rise over last 100 years to be in all probability caused by anthropogenic forcing[lvi].

Add to that the certainty that there is at least another 0.6° rise already in the system and the room for manoeuvre before changes lead to runaway effects is narrow, and the case for delaying action now evaporated.

There are two categories of action. One is the obvious one of radically reducing the emissions of greenhouse gases. If the upper CO2 limit of a total of 400 – 450 parts per million by volume (of the atmosphere) is right, then reaching and holding to that within the next few decades *and* insuring some 'space' for the very poor to increase their emissions, means *at least* a 60% reduction in emissions will be required by the richer countries. However, given that we are extraordinarily profligate in the way we use energy and resources (see "The Physical Challenge" in Chapter 5) and there is no reason why we cannot shift to a low carbon economy, there is room for rapid action here.

But as well as reducing our *demand* on the environment's goods and services, we ought to, *at the same time and with equal vigour*, join forces with the *supply* side – that is invest in the biological capital of the Earth so as to increase its capacity to mop up our emissions. Time lags between cause (tonnes of CO2 emitted) and effect (climate change) mean it will be some time before the benefits of reduced demand are felt. But judicious (i.e. respecting different eco-systems) increase of biological *area* could bring results in much shorter timescales.

In January 2005 French President Chirac hosted an UNESCO international scientific meeting on *Biodiversity, Science and Governance* to parallel UK Prime Minister Tony Blair's conference for climate change scientists, and bring forward scientific consensus on which policy decisions can be based. The focus was on diversity of species and, without a doubt, halting and reversing the loss of species and reduction in biodiversity is extremely important. Larger animals act as signal species, indicating the health of a habitat. According to the UN Environment Programme the area of protected sites has risen from 2.78 million sq kilometres in 1970 to 12.18 million sq kilometres in 2000 (UNEP, 2002: 124). At the same time, however, the Living Planet Index (UNEP, 2002: 122) shows a steady decline in biodiversity in forests, marine and fresh water ecosystems. Moreover, it is estimated that 23% of all useable land (excluding mountains and deserts) has been affected by degradation sufficient to reduce its productivity, with an increasing proportion strongly or

extremely degraded – the latter category deemed to be beyond restoration (Oldeman et al, 1990) So while more protected areas sounds like good news (though it is still only 12.18 million sq kilometres or 8% of a total land mass of 140 million sq kilometres), the overall picture of a net loss of productive land as population grows without a concomitant drop in overall demand is not rosy.

Which is why the first pre-emptive strike must be to halt and reverse the loss of biological *mass*? Because of the importance of biological diversity to the resilience of planetary ecological systems, and because we need all the help we can get to mop up the CO2 and other emissions from human activity, the natural world remains the most powerful waste management system there is. Expanding its capacity to help us has to be a priority – and is something that can be done everywhere from local back gardens to global eco-regeneration projects.

2. Re-defining security

The concept of environmental security was first used at a UN Assembly in 1987, the year the Brundtland Report was published, but debates about what it means are not resolved (Dabelko and Dabelko, 1995). Yet from our cave days, we humans have been preoccupied with the exigencies of living with nature. Our evolutionary experience has majored on protecting ourselves from predators and the weather and finding food and water. The oil crises of the 1970s illustrated on a global scale what happens when key resources suddenly become scarce, as famines and the collapse of communism have highlighted the stresses caused by people moving away from environmental and economic insecurity as well as from war. Shortage of water for drinking and agriculture is viewed as one of the most serious causes of conflict now and for the future. One third of the world's population is estimated to live in countries suffering from moderate to high water stress – a number expected to rise to two thirds within 20 years or so (UNEP, 2002: 150). Forty percent live in river basins shared by 2 or more countries. Local conflicts over water are frequent, and international ones are anticipated. Why else would countries like Namibia be buying fighter jets, if not in anticipation of war over water? Over half the world's people live in coastal areas, with their vulnerability highlighted by increasingly regular extreme weather events, including the December 2004 tsunami following an earthquake in the Indian Ocean.

Latterly, the term 'environmental security' was taken over by the military. At a NATO conference in 1995, William Nitze, then Assistant Administrator for International Activities, for the US Environmental Protection Agency argued that environmental security could have the same intellectual force in the defence and national security community that arms control had in the 1960s -1980s, because of its relationship to vital national interests. At the same conference, Leon Fuerth, National Security Advisor to Vice President Al Gore, commented that an 'evolution' in thought about environmental issues had brought to light the connection between the state of the environment and national security. [lvii]

Around the same time the notion of 'collective security' was being developed in military circles. Also in 1995 Robert McNamara, former Secretary of State for Defence and subsequently President of the World Bank, suggested that "the international system that relies on the use of military force as the ultimate guarantor

of security, and the threat of its use as the basis of order, is not the only possible one. To seek a different system (based on collective security) … is no longer the pursuit of an illusion but a necessary effort towards a necessary goal." [lviii] McNamara felt that if the US and other major powers had made clear their commitment to a system of collective security (based on the rule of law) and to protecting nations against attack, then the 1990 Iraqi invasion of Kuwait might have been deterred.

Collective security as a concept to shape international peace has fallen on hard times. It certainly has not coloured the USA in its response to the terrorist attack of 11th September 2001, or subsequently.

Since the early 1990s, this author has argued that unless the environment becomes an actively and energetically deployed tool for peace, it will inevitably go on growing as a cause of conflict. "There is only one pot of glue that is strong enough to unite the world around a positive common project, and that is the urgent task of securing a life supporting environment. It can provide not only a logic to underpin all that we do, but used with sophistication, the need for a life supporting environment can serve as a diplomat in the resolution of many seemingly intractable areas of human conflict." [lix] The examples given then have been overtaken by time, but the essential point was - is - that regardless of colour of skin, religion, race, recent or historical injustice or brutality inflicted one upon the other, each of us shares the same basic needs for life – especially when it comes to water and food.

As the first principle of diplomacy is to start from the common ground shared by all the protagonists and work out from there, the deployment of the environment as a *negotiator* for peace and security makes perfectly good sense. [lx]

Stepping up the international effort around environmental *diplomacy* could also be the route to resolving global institution governance difficulties too. The UN Institutions, the World Bank, International Monetary Fund, World Trade Organisation were all established after the Second World War and are acknowledged to be institutions in need of reform. They may respond more swiftly to some high level obligation on them to regroup around 21st Century challenges. Climate change and its accelerating effect on water and food insecurity in particular make a new approach to environmental security an urgent one at international level. But at local level, in communities and neighbourhoods, re-defining ideas of security around shared environmental benefits can help repair or strengthen both human and economic relationships[lxi].

3. Future markets

When Adam Smith and James Hutton walked around the streets of Edinburgh, they were seeing changes that, within a few decades, would turn into the explosion of the Industrial Revolution, as mechanisation and concentration of production turned raw materials into a rapidly growing range of goods of every type and quality. Both foresaw the social consequences of what was beginning to happen, but neither was conscious of any limits in the environment's capacity to provide resources to feed the

production, or services to absorb the consequences. Pollution was a health issue, not an environmental one.

A successful enterprise then, and now, was able to grow its output of material things, and national economies became more adept over time in calculating the total of that output in cash terms. People with money (earned from either owning the means of production or working for someone who did) were also able to buy services – such as lawyers, doctors, servants and so on – also expressed in cash terms. To this day a national economy's success is judged according to a complex calculation of its 'product' of goods and services expressed in cash (Gross National Product). And in the UK at least, expenditure on education and health is recorded not on the investment side of the national accounts, but on the cost side.

Elsewhere I have noted some of the people and organisations who are developing alternative ways of expressing the national accounts and of defining the economic success of a country or company. (e.g. Ekins, 2000; New Economics Foundation[lxii]) So there is no shortage of ideas and policies for changing the architecture that currently governs the way that success is pursued and judged.

Here, the pre-emptive strike proposed is the re-shaping of the rules of the economic market-place (local, national and international) to favour the production of affordable and secure supplies of low carbon goods and services. That is, everything from teaspoons to sea-going cargo-ships to telephone systems to drinking water is designed, manufactured and delivered with at least 10 times less energy and resource use than it is today. This is where the reduction of our physical demand on the environment has to be focussed. There are loads of examples of how this is happening already, and, apart from the current culture of defining economic success in monetary terms, and the culture of the stock market demanding short-term returns on shareholder investments, we could have lots more of it (just two examples: Baungart and McDonagh, 2002; Weinsacker et al, 1997).

It is really important to realise that we are talking about human designed culture here. The rules that govern the way economic accounts are constructed and the way the stock market judges listed companies are not immutable. Unlike the laws of physics that govern the way the material and biological world works, we can change the rules governing economics. Without a doubt, change of the global system will take some time – which is why the introduction of environmental and social criteria into the next round of the World Trade Organisation decision-making (at Doha in December 2005) is so important to set the ball rolling on a differently tilted global trading playing field.

But in the meantime, new markets can be made by both the demand and the supply side of the equation. In the next section, about re-creating the sort of society that is both resilient and able to develop, I look at the demand side and how people may have been cast as mere consumers of what the market produces rather than as whole people. Here the focus is on the supply side, and the role of the suppliers of goods and services. They are playing hard within the prevailing idea of success as defined by government economic policy, and/or the stock market, yet nevertheless have the power to develop a counterpoint to the status quo culture and values.

Part of that counterpoint started several years ago as companies and organisations took up environmental policies and adopted environmental management systems, such as ISO14001 or EMAS. These systems are complicated and more driven by process than by environmental outcomes. The Environment Agency for England and Wales actually found that a company's compliance with such systems did not necessarily mean it would pollute less than any other.[lxiii]

More recently, the idea of corporate (meaning whole company or organisation) responsibility has expanded to cover social and ethical considerations. Though there is an ongoing debate about whether ethics are external to or embedded in the concept of sustainable development, most of the confusion is caused by sloppy use of words (see Chapter 4, "Dealing with Definitions"). Hotting up is a debate about the precise role of business in the state-private sector-civil society relationship. Some businesses have embraced what has become known as the Corporate Social Responsibility (CSR) agenda and found that taking environmental and social responsibilities seriously works. A compilation of benefits is mapped against the headline leadership objectives of a company by Forum for the Future's Business Programme. (See Table 3)

Table 3: Benefits from engaging with the sustainable development agenda

Reputation	1. Customer preference/loyalty 2. Key stakeholders 3. Influence with government/regulator etc.
Quality Management	4. Better Risk Management 5. Lower costs (resources, compliance, costs avoided) 6. Motivated, committed staff 7. Able to recruit best talent 8. Fertile bed for intellectual capital to grow
Market Advantage	9. Stronger 'brand' 10. Anticipate future markets 11. New products/processes/services 12. Adaptability – more options in volatile business climate
Profits	13. Enhanced shareholder value 14. Lower cost of capital 15. Increased market share 16. Optimal investment strategies

However, a strong lobby argues that it is not the role of business to substitute for (or pay for) government policy (Jones, 2005). A favourite story is of one of the founders of Marks and Spencer, the UK high street store chain, who was upset when a member of staff fainted during one of his visits. When he found out the reason was hunger because her husband was out of a job, he started the tradition of providing lunch for staff. It was not his duty to cure poverty, he said, but he could prevent his employees from fainting from hunger. A similar point is made by business today. A typically robust article in *The Economist* magazine pointed out that it was not the responsibility of business to save the planet, but to create wealth, and rather

extraordinarily opined that "broken corporate governance and CSR (Corporate Social Responsibility programmes) are close relations." [lxiv]

It is true that some companies are using CSR like a defensive shield – to protect them from ankle-biting and reputation threatening attacks from campaigning organisations like Greenpeace or Friends of the Earth. But slowly, some of the more thoughtful companies are realising that sustainable development is not a fad that will go away if they keep their heads down, but a reality that is coming their way fast. They recognise that historically it is those companies that get the future market place right that not only survive but also thrive, and key to achieving that is recruiting and keeping the best talent in a job market where a growing number of young people prefer to work for a company or organisation which reflects their own values. The 2005 Guardian annual survey of students revealed that 60% are concerned about environmental and social justice.

It is wrong for companies to argue that they only supply goods and services that are demanded by customers. The relationship is far more sophisticated than that, as the way the demand for organically grown food has outstripped the domestic capacity to supply it shows for example. Because the market for ethical products and services is an expanding one, the business sector can stimulate its growth by moving into that sector and actively helping to stimulate more demand through advertising and competitive pricing.

Some companies have opened their minds to the challenges of sustainability and 'gone beyond' CSR to ask that key question "What can I contribute? How can I do more to contribute over time?" The Co-operative Bank is one pioneering example where the company uses sustainable development as a framework for not only how they do business, but also what business they do. No company has to wait until the rules of engagement in the market place are changed to improve their contribution today. Nor do they have to wait to prepare for or influence the market places of the future which will be for affordable and secure supplies of low-carbon goods and services (Cowe and Porritt, 2002). At the moment, however, the most powerful business lobby is the one that prevents government from changing the rules.

This pre-emptive strike is about the private sector making markets as well as collaborating to change the rules that govern that market place so it becomes cheaper and easier for it and us to be green.

4. Re-knitting social fabric

We are, as a species, now cast as consumers on the stage of local, national and international human development. The economy is not interested in the rounded performance we would like to give during our lives, only in our shopping habits. Consumption has become a surrogate measure for happiness because the success of a national economy is measured by the amount of consumption and therefore production that is going on. But if the evidence of the 'economics of happiness' brigade is only half right, then there is a huge opportunity to redefine what makes a community feel content and at ease with itself – as the various Indices of Sustainable Economic Welfare show.

The study by John Hopkins University suggests that civil society has started to apply adaptive management techniques already. The burgeoning of small not for profit businesses, charities, voluntary groups and so on over the last decade represents a positive personal and collective response to the perception (or reality) that government and other agencies are simply not able to deliver on key issues, like poverty, justice, a healthy safe environment. Gradually, the desire to 'live and do things differently' is becoming *sufficiently* evident to be considered a hugely important resource for governments struggling to implement sustainability policies against the tide of global competition and powerful sectoral interests (e.g. oil, transport) (Hertz, 2001). I say sufficiently, because it is true that people are reluctant to recycle or leave their cars in the garage until they feel they are not alone, but with the majority, which they are not – yet. Yet in the UK, when one of the London local councils wanted to introduce higher building standards, developers were reluctant to get involved. As soon as the standards were applied to the whole of London, however, developers joined in happily. The point being that leadership is not about waiting for 'permission' to act, but by acting wisely so that the majority are happy to join in.

So when governments start to use the idea of choice as a *goal* for policy it comes over as a diversionary tactic. An escape from difficult group decision-making (e.g. facing up to global competition and big sector interests) and a transfer of responsibility (but not power?) to individuals as we shop or arrange for health care, pensions, houses and holidays. It may seem easier for governments to opt out like this, as shopping around becomes a more global and virtual exercise, and competition for customers increases. The idea that increased choice will lead to a 'perfect' market situation is, however, flawed. In Adam Smith's market it is just about imaginable that negotiations between buyers and sellers could get the prices right and adequately mediate supply and demand. Getting the relative information to equalise power between buyer and seller was possible. They often met together physically in the market place, be it a town square, tavern or commodity exchange. Today the proliferation of choices and the multiple variables involved make it hard for shoppers to accumulate anything near the information they need to make what the market calls 'rational individual choices.' In the very local marketplace I can squeeze a cabbage and judge its quality in relation to its price and the other stalls nearby. But in the global marketplace how can I decide what is best for the environment, my values, for me? Should I buy books at my local store where I meet people, or online from Amazon? Is it better to buy an organic lettuce air-freighted for freshness from California or the more local produce where pesticide and fertilizer has been used? Without spending days with a calculator how to decide between many different options for phone services, mortgages or pensions – on price never mind ethics?

In a Fabian Society Publication, *A Better Choice of Choice*, Roger Levitt and his colleagues argue that policy should be based on "explicit quality of life and environmental objectives, not economic proxies for them … [and] in some public services standards should be recognised as more important than choice and the state as more effective provider than the private sector." (Levitt et al, 2003). Choice as an objective is as crazy as consumption as an objective for adding to the sum of human happiness, as the evidence of the health risks of *over*-consumption (of food,

of chemicals etc) proves. One billion people starving in the world while another billion are health-damagingly obese? This is a ludicrous situation, surely *prima facia* evidence that giving star billing to the economics of competition, consumption and choice is a historical error. What happened to the primacy of quality and the notion of sufficiency and fairness as goals to govern both production and consumption? How much of today's furniture will last long enough to become an antique?

It has to be possible to re-cast people's wholeness and the richness of their relationships with each other and the environment rather than the contents of their shopping bags as the main actors in our societies and their economies. We have evolved far more than as an isolated hunter for bargains at IKEA. All around the world there are examples of resilient societies. Jared Diamond cites the Netherlands as a modern, developed country example. (Diamond, 2005) But most are in poor countries where ill-conceived or executed development programmes have not yet shattered the complex networks that make the survival and the happiness of the individual the job of the collective. Most operate rationales that are variations on the theme of 'do unto others as you would be done to yourself'. Even in the secret-police corroded societies of pre-democratic east Europe, strangers held places for each other in food queues because that was how society made it through hard times. The economic collapse after 1989 was less to do with the final death throes of the so-called formal economy, than the unwitting destruction of the complex network of 'informal' means by which people meet their needs.

Re-creating the sort of communities and societies that enjoy a sense of common purpose and wellbeing in a local sense as well as in a global sense is perhaps the hardest thing that developed countries will have to do. Governments can recalibrate their policies to reward enrichment of the social fabric more than that of the individual, and make wise decisions that lead us all in the direction of a locally satisfying and sustainable way of life. Sorting out the planning system, investing in eco-regeneration at a local level, and giving power as well as responsibility to local communities are just three components of this particular pre-emptive strike.

The rest of us can choose to be defined as more than consumers, and make it clear that happiness (for ourselves and others) is our top priority, and that there is more to being happy than doing a massive shop at Christmas. We can keep on collaborating in our businesses, charities and voluntary groups, in our neighbourhoods, creative and special interest groups and friendships, to deepen, multiply and extend our relationships with each other and with our environment.

In the year 2005 a child will be born that tips the balance so that more people live in urban than in rural areas. Getting along with each other and making our neighbourhoods safe, convivial places to be will depend on how good we are at making a lot of good relationships.

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"… *the people who will succeed 15 years from now, the countries which will succeed, are those which are most based on a sustainable vision of the world. That is what we should be training people to do."* Charles Clarke (March 2003) [lxv]

Interpersonal skills – building all types of relationships, being able to participate in groups and communities, feeling comfortable when communicating, and knowing how to listen, learn and evaluate situations – are all things everyone *should* be able to do by the time they leave school. Too many are still struggling over whether they are going into further or higher education or into work. Quality of teaching – of such skills as well as subject matters like language, maths and science – is a top priority for most governments now. The OECD publishes comparative tables of country achievements, and the level of education of the workforce is featured in the OECD's comparisons of member countries (the 26 richest). Knowledge and skills – described as human capital – are part of the economic analysis. Not officially included but available are other indicators, of the strength of social capital, for example, or the quality of the infrastructure. Paradoxically, the Olympic Committee appraising venues for the 2012 games are including such things in their evaluations. Regeneration and environmental protection and enhancement are on their tick lists – though maybe not in a way that would satisfy the greenest of the greenies.

So thinking about projects and decisions of all sorts through a sustainability 'lens' – checking across the vital five capital stocks to be sure the contribution to all will be as positive as possible and negative impacts avoided – is beginning to happen. But only exceptionally. The UK has had difficulties in developing its local waste strategies because a large number of the people involved had little or no understanding of the basic science underpinning the processing of energy and materials – so rather too many schemes were devised that *added* to the waste stream rather than reduced it!

2005 to 2015 is the UN Decade of Education for Sustainable Development. While this author has a bit of antipathy to years of that and decades of that, this particular decade could not be more important. If we expect people to behave differently they, at the very least, need the necessary skills and knowledge to enable them to do so. Sustainability literacy should join information and communications technologies literacy in the canon of essential 21st century literacies, and just as it is not necessary to know how to programme a computer to use ICTs successfully, not everyone needs to know complex chemical formulae of chemical pollutants or the list of forthcoming EU legislation to be sustainability literate. What people do know and are able to do should be determined by their sphere of influence at home and at work – and by their interest. Though not properly researched, there is a great deal of anecdotal evidence to suggest that learning basics like maths, writing, or how to work in groups can be mediated more easily through learners' interest and enjoyment of the natural environment – even if it is squeezed into the school back yard, along a railway track or in a busy city centre (where birds, bugs and occasional foxes live too)[lxvi].

As long ago as 1972, the first Earth Summit in Stockholm cited education as one of the most important routes to setting the world on a path to a more sustainable way of doing things. But learning why so little has been achieved in terms of integrating

sustainability 'literacy' into the curriculum over the last 30 years will be important if the UN ESD decade, which kicks off on 1st March in New York, is to make up for lost time [lxvii]. Some examples of responses from teachers and course designers:

- It is vague and meaningless, my job is difficult enough without any more confusion
- It is the environment isn't it – and we are doing that
- It is a political thing, an ideology, and therefore not a legitimate thing to put into my course
- It is hugely complex, a vast body of knowledge that goes across many subjects and disciplines, therefore too much to put on my course, or to expect my staff (or me) to know about.

Research carried out by Quadrangle, a communications consultancy, for the now defunct UK Round Table on Sustainable Development, showed that there is little understanding of the current *language* used to communicate sustainable development with the result that educators couldn't grasp what it encompassed. The conclusion was that "the best way to educate people about sustainable development is to help them discover what the term encompasses, what it means and how it should affect the ways they live their lives … [so] they will discover sustainable development for themselves and begin to apply it within their world, thus establishing a basis on which to describe it in their own words. (UKRTSD, 1999) The Quadrangle research confirmed findings from the Sustain It initiative (see Box "Sustain It" below) that, generally speaking, people arrive at a *personal* understanding about the meaning of 'sustainable development' in many different ways, depending on their social and cultural experiences. What's more, that *personal* understanding was more often than not *good enough*. As long as people are more likely than not able to act and decide in a way that favours sustainable development, whatever their job or situation, change will begin to happen. Which means, not special courses for sustainability 'experts', but the integration of relevant knowledge and skills into *every* course taught.

Box 1

Sustain It

In the summer of 2001, Forum for the Future conducted a series of sustainability learner needs analysis workshops with employees from the British Airports Authority, Surrey County Council and HM Customs and Excise. The workshop found that participants, drawn mainly from the middle of the organisations:

- had very different (but largely valid) starting points and viewpoints on sustainability
- came with a wide variety of levels of prior knowledge and understanding and were not puzzled by it
- were able to structure opinions, comments and experiences if provided with an appropriate framework
- were most interested in what they needed to know to implement sustainability
- grasped the distinction between information about it (awareness, theory, facts) and operational learning about how to work towards it in their jobs
- had a clear preference for learning in groups and workshops and learning through practical examples and case studies
- valued being taken out of the workplace and working with other organisations
- recognised that e-learning could be flexible and convenient, maintained some scepticism about it.

Catherine Atthill's report on Sustain It workshops prepared for Forum for the Future, August 2001.

A working definition of sustainability literacy was developed during the Higher Education Partnership for Sustainability (HEPS) programme at UK sustainable development charity Forum for the Future. (See Box 2) It was affirmed by a seminar/workshop held in partnership with the UK Department of Environment, Food and Rural Affairs during the UK Governments review of its Sustainable Development Strategy, which is due to be published in March[lxviii].

Box 2

Sustainability Literacy

Expressed at the highest level, a sustainability literate person would be expected to:

- Understand the need for change to a sustainable way of doing things, individually and collectively
- Have sufficient knowledge and skills to decide and act in a way that favours sustainable development
- Be able to recognise and reward other people's decisions and actions that favour sustainable development

Understand the need for change to a sustainable way of doing things, individually and collectively

Most people do have some understanding of what sustainable development means. However, a sustainability literate person will have sufficient knowledge and understanding to talk to others in a positive and engaging way about matters relating to sustainable development. They will be able to make a coherent argument for why change in behaviour is needed and how it might happen in practice, drawing examples from their own sphere of influence and operation and linking that to their own values and to the wider context in which they live. They will be able to make links between the social, environmental and economic aspects of sustainability and make connections between their neighbourhood, their workplace and what is happening globally.

Have sufficient knowledge and skills to decide and act in a way that favours sustainable development

A sustainability literate person will be equipped with a number of intellectual and practical tools that enable them to take decisions and act in a way that is likely to contribute positively to sustainable development. They will be able to make decisions on specific matters, such as advising on financial investment, buying food or writing new policy for prisons, by applying the 'At the Same Time' rule - that is, taking environmental, social and economic considerations into account simultaneously, not separately.

Be able to recognise and reward decisions and actions that favour sustainable development.

A key principle of reinforcing good practice or behaviour is to recognise when it is taking place and to acknowledge if not reward it. This principle applies from bringing up infants to major publicity campaigns. A sustainability literate person will know the importance of encouraging and reinforcing behaviour that favours sustainable development.

HEPS (2004), *Learning and Skills for Sustainable Development: Developing a sustainability literate society*, London, Forum for the Future

The goal must be to ensure that *everyone* who leaves publicly funded education has the capacity to act and choose in a way that contributes to sustainable development *whatever* their scope of influence may be – at home and at work, remembering that s*ufficient* knowledge is enough. What is sufficient can be determined by the actual or prospective scope of influence of the learner. For example, school leavers need a basic, transferable level of knowledge, while what older learners, perhaps studying specialist subjects, need to know depends on their role. Some, but not all, of what a hairdresser needs to know will be different from that of an engineer. And no course or subject is exempt. Making musical instruments, for example, can have negative environmental and social impacts in the same way as making coffee or trainers do, but their use has positive impacts on the building of human and social capital including nourishing the human spirit and celebrating the environment.

Interestingly (and not too surprisingly) the DEFRA workshop confirmed that the skills relating to sustainability literacy are closely aligned to the skills anyone would need to participate fully in life, and that the level of knowledge required depended hugely on the scope of influence of the learner. Not everyone needs to know everything – but everyone does need to know something.

Making sustainability literacy an integral part of any educational experience is not as complex as it sounds. Again simple tools added to a high quality approach to designing curricula and course delivery are all that is needed – and they exist. So fast-tracking trainers of teachers and course designers to be competent – and confident – in their use is the first step. That does require a pre-emptive strike from organisations that plan, fund and regulate education. The odd example of excellence over the last 10 years has not infected others as had been hoped. Integrating sustainability literacy into all learning experience needs a pre-emptive strike to set the ball rolling, but will only succeed if effort is maintained into the long term. (HEPS, 2004)

Real world values: the politics of reverence

"*Society needs to do a better job of asking what sort of society we want, and of the values we want to govern it."*

These words were spoken by Lord May, current President of the Royal Society, former Chief Scientist to UK Government, and a renowned zoologist and ecologist. He is reflecting widespread feelings that, when it comes to deciding whether to allow yet another two supermarket chains to merge; whether it is OK for our water or other utility be owned by a foreign corporation; whether we want genetically modified organisms to be grown; whether it is OK for 1 billion people to be starving while our televisions screens fill with programmes about obesity; whether it is OK to build more homes in the Thames floodplain while towns and cities shrivel in the north of the UK; or (his favourite), why do we have to keep buying a whole load of useless stuff in order to keep the economy going?

Asking questions about where we are all going, trying to find the purpose of our ever more furious effort, are becoming more commonplace. Not prone to this sort of reflection (in public at any rate) the British surprised themselves by responding to a

radio poll on the subject listeners would most like added to the school curriculum. Admittedly the audience can be construed as 'educated', but top of the poll came Philosophy. Despite plot lines that sometimes transcend belief, even characters in the more popular and populist soap operas spend a lot of time discussing and searching for meaning in relationships and events.

So even if it may be some time before units of happiness measure human accomplishment, striving for happiness is not only the right thing to do, but also part of being human. We want to feel we and our families belong to a loving society, and we enjoy the search for meaning and understanding, whether it is about the outcome of a football match or about life, and even if a lot of the time any conclusion is elusive.

The answer to how we achieve a more sustainable way of life is in ourselves, not in some yet to be invented technology. Maybe some new technologies will be helpful, but a focus on novelty as opposed to using the existing technologies, knowledge and experience we have wisely, is to cling to the sinking raft of old thinking. Science – good science – to help us meet our needs through mobilising radically less material and energy (the only real way to reduce greenhouse gas emissions) is critical, but imagining that science can be what Mary Midgely (2003) calls 'omnicompetent' could become another historical mistake.

Several people have written well about the role of science in achieving sustainable development, (see e.g. RCEP[lxix]; Porritt, 2000), but the missing 'governor' to what goes and what doesn't go in science – as in economics, politics and society – is values. Values that are consonant with the sort of people we want to be, values put into action today that will make our children and grandchildren proud of us.

This paper started by suggesting that the purpose of human life was happiness. It has tried to demonstrate that happiness for ourselves is inextricably linked to happiness for the ecology of the Earth. We can't have one without the other. A connection that was missed by both Adam Smith and James Hutton, not to mention the many others (almost entirely men) who populated the European Enlightenment and the subsequent industrial revolution to shape the institutions, priorities and, yes, the values we have today. (See, for example, Capra, 1982; Uglow, 2002) As a consequence (direct and indirect), two of the Gods we worship most – capital S Science and capital E Economics – aren't the slightest bit interested in our happiness. They both go out of their way to say they are value free activities, completely neutral with regard to the human condition, therefore providing a Truth to be taken unquestioned.

But we know that to be not true. Science is not monolithic. The word means any body of knowledge or a technique for systematic study of a body of knowledge, and is applicable to the whole of the natural world and to people as much as it is to sub-atomic or sub-genetic materials and large shiny bits of kit. The word scientist didn't even appear until around 1830. Up to then people who experimented and invented new ideas, even those working with shiny kit or chemistry like James Watt and Josiah Wedgewood, were known as moral philosophers.

We all need to become moral philosophers now. Jared Diamond and Bob May, and a host of others are right. This is the moment to stimulate a public debate, large, wide and honest, around the values that we want to govern our society and steer our relationships with each other – internationally, economically, and in our neighbourhoods. There seems to be an appetite for it, and it can be argued that it has already started. But can we accelerate the process? Any great strategist, be they leading companies corporate, or companies military, will know that continually refreshing the purpose, main objectives, values and tactics that shape the progress of the organisation is central to success in inspiring those that follow. Diamond gives stark warnings about how stagnation or complacency and refusal to re-evaluate strategies can lead to collapse of societies. The evidence of climate change and persistent and corrosive levels of poverty and inequality suggest that debate and action need to go hand in hand.

We do have a great advantage in that a new, refreshing purpose for the human species is being articulated. Yes, it is the business of survival as is evolutionarily usual, but by providing the missing connection between the two world views of Adam Smith and James Hutton, it is possible to see how that survival can have a quality that adds to the sum of human happiness. Most importantly, we now have a pretty good idea of how to get there - by making top quality relationships with each other and with the environment the central objective of our economic system (sustainable capitalism). Just like the moral philosophers of a couple of hundred years ago, those advocating sustainable development as a new world view can provide both inspiration and practical solutions.

A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.

Aldo Leopold, 1948[lxx]

Post script

In the same year as the first UN Earth Summit, 1972, *The Ecologist* magazine published *A Blueprint for Survival*. [lxxi] Its articulation of sustainability remains pretty good:

"The principle conditions for a stable society – one that to all intents and purposes can be sustained indefinitely"[– are:]

- "minimum disruption of ecological processes
- maximum conservation of materials and energy – or economy of stock rather than flow
- a population in which recruitment equals loss
- a social system in which the individual can enjoy, rather than feel restricted by, the first three conditions." (p.30 Penguin edition)

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APPENDICES

Appendix I: Sustainability Appraisal Grid for a University

The University's resources and stocks were broken down into one of five 'capitals' which meant people could think about sustainable development at their institution in a new and joined up way. This grid shows the range of things that a university or college can contribute to sustainable development as a business, centre of learning and research and a member of the community.

	what can a university or college contribute as…		
	As a business	***as a place of learning and research***	***As a key member of the community***
NATURAL The resources and services provided by the natural world For example: water, livestock, energy, timber, the carbon cycle	**1. Use resources efficiently** • Reduce energy and raw material use • Drive waste out of the system	***2. Develop the new economy*** • Exploit teaching, research, business development opportunities in low-carbon, high human creativity economy	*3. Conserve, enhance the environment* • Subscribe to low impact travel schemes • Increase biological space and diversity (on campus and locally)
HUMAN The energy, motivation and capacity for relationships, and the intelligence of individuals For example: people's health, knowledge, skills, motivation	**4. Attract and keep good staff** • Create community of purpose for staff, students, other stakeholders • Be a values- led organisation • Ensure healthy working culture and physical environment • Be active on diversity and training	**5. Provide good student experience** • Be a values-led organisation • ***Ensure healthy working culture and environment (a new 'conviviality' quotient)*** *Enhance employability of graduates* • Ensure sustainability literacy for all	**6. Promote lifelong learning** • Mix on/off campus learning experiences for both students and community (work-based learning) • Clear learner paths in and out of HE – from school, FE, work, non working
SOCIAL The social groupings that add value to individuals For example:, families, voluntary organisation, faith groups, communities, universities	**7. Provide good governance, management** • Ensure clarity and coherence in strategic planning and well trained managers • Modernise charters, decision-making systems to ensure transparency and democracy and accountability	*8. Anticipate future markets for graduates* • Articulate and meet 21st century challenges through teaching, research, knowledge transfer • Promote a vision of future that engages new generations • Prepare graduates for multi-disciplinary approaches to problem solving	**9. Respond to other policy agendas** • Ensure equal opportunities/access, and other human rights • Understand employer demand in context of future needs • Provide leadership for society in complex, rapidly changing times • HE to set as well as respond to agendas

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MANUFACTURED The material goods that exist already For example: buildings, railways, tools and machines	**10. Demonstrate best value in use of estates** • Ensure building design, refurbishment, all estate management is best practice for purpose and for environment • Forge local partnerships (eg renewable energy generation)	**11. Excellence in research and teaching** • Integrate student learning with campus improvement and community experience • sustainability research/ consultancy • Encourage innovation for sustainable design solutions	**12. Promote community relations** • Share sports, library other facilities • Build portfolio of joint ventures for student, staff and local residents • Sustainable transport partnerships
FINANCIAL The money, stocks etc that enable us to put a value on, and buy and sell the above resources	**13. Save money and be efficient** • Use whole life costing • Invest ethically (eg pensions) • Provide incentives for adding value to physical resources	**14. Compete internationally and regionally** • Structure internally and make relationships to facilitate ideas-innovation-implementation process • Export models and programmes	**15. Modernise risk management** • Report on environment and social impacts as well as financial • Use procurement strategies to support local markets and ethical trade

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Appendix II: Sustainability Appraisal Grid for a banking corporation

	as a business	***as a place of learning and research***	***as a key member of the community***
FINANCIAL	• Growth in revenues	• 'Green' risk management & financial transactions • Socially Responsible Investment (SRI) • Environmental responsibility 'know how'	• Shareholder return
MANUFACTURED	• Building ecology • Intelligent engineering		
SOCIAL	• High level leadership • Good Governance • Transparency • (middle-aged male Board!)	• SRI • Optimus Foundation • Anti-money laundering policy	• Equal opportunities employer • Invest in regeneration • Sport & Arts sponsorship • Global Compact
HUMAN	• Staff Training • Good information • Health & Safety • Diversity (indicators)	• SRI	• Staff charity supported • Staff volunteering • Invest in education
NATURAL	• In-house ecology • Green Supply chain • Renewable Energy	• 'Green' risk management & financial transactions • SRI	• Invest in environmental projects

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Appendix III: Sustainability Appraisal Grid for the chemical industry

What can the chemical industry do to maintain or enhance the 'stock' of the following resources, or 'capitals'	***As a business, accountable to shareholders***	***As a provider of products and services***	***As a significant member of the community where it operates***
FINANCIAL *The money, stocks etc. that enable us to put a value on, and buy and sell, the above resources and ways that value can more accurately represent the real 'cost' of using them.*	• *Makes acceptable financial returns* • *Account for total cost of activities encompassing both intangibles, risk and externalities* • *Shift the focus of management compensation from short term financial performance to include areas of sustainability performance*	• *Total cost accounting is reflected along value chain* • *Create economically viable products* • *Research and development priorities aligned to sustainability objectives*	• *Contribute to local economies through appropriate taxation in all areas of operation.* • *Eliminate corruption* • *Philanthropy aligned to strategic vision of company* • *Systematically avoid any "legacy effects" associated with operations and products*
MANUFACTURED *The "stuff" that already in terms of infrastructure n terms of the tools, machines, roads, buildings in which we live and work, and so on.*	• *Maximise process efficiency* • *Reduce volumes of throughput (energy, raw materials etc) for each unit of output)* • *Audit supply chain performance*	• *Infrastructure encourages product reuse and recycling*	• *Provide communities with appropriate access to and use of physical assets. For example, community groups provided with use of office space etc outside of normal working hours.* • *Continued investment in the maintenance and development of infrastructure that reduces risk of negative impact on the community.*
SOCIAL *The social groupings that add value to individuals (e.g. families, communities, parliaments, universities)*	• *Encourage local procurement* • *Ensure that employees understand company vision, policies and programmes.* • Support and encourage progressive regulation	• *Communicate information related to product performance, risks and appropriate use.* • *Assist consumers to understand the impact of their actions and consumption patterns.*	• *Sustainability performance is openly and accurately communicated* • *Develop partnerships with the local community* • *Involved in education programmes* • *Community investment programme aligned to sustainable development*
HUMAN *The energy, motivation, capacity for relationships, and intelligence of individuals*	• *Implement (continuous) employee training and development schemes* • *Develop leadership* • *Implement diversity and inclusiveness programmes* • Protect health and safety of employees • Provide opportunities for personal growth	• *Eliminate negative health and safety impacts of products* • *Design products that meet human needs and enhance quality of life*	• *Foster local employment* • *Develop employee volunteering programmes* • Engage in dialogue • Protect human rights

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NATURAL *The resources and services provided by natural world*	• *Eliminate the use of non-renewable energy* • *Use energy efficiently* • *Use water efficiently* • *Use raw materials efficiently* • Audit supply chain performance • Eliminate waste • Operate to a consistently high global standard of environmental and social performance • Increase resource productivity	• *Develop products that reduce energy use of customers* • *Develop products that copy natural processes* • *Improve biodegradability* • *Remove toxicity* • *Eliminate persistent compounds* • *Design products for reuse and recycling* • *Service models replace products*	• *Protect and enhance biodiversity* • *Commit to long-term carbon neutrality* • Eliminate noise and odour • Eliminate visual intrusion • Eliminate negative impacts of local air quality

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NOTES

[i] For an overview on the issue of ethics in anthropology see: *Joan Cassell and Sue-Ellen Jacobs* (ed) (Handbook on Ethical Issues in Anthropology, A special publication of the *American Anthropological Association*, Number 23. http://www.aaanet.org/committees/ethics/toc.htm

[ii] John DiIulio, former head of White Office Faith Based and Community Initiatives in a letter to Ron Suskind used in Suskind, 2003.

[iii] See www.peopleandplanet.org/

[iv] *The Engineer of the 21st Century Inquiry*, July 2000, London, Forum for the Future

[v] Written 22 June 1830

[vi] See UK edition with Foreword by Paul Ekins

[vii] Summary of reports on http://www.ipcc.ch Full references from the IPPC Assessements, various years, published by Cambridge University Press

[viii] Published in Russian in 1926

[ix] The Law of Conservation of Mass, and the Law of Conservation of Energy (also known as the First Law of Thermodynamics). See Jackson, 1996, for straightforward explanation of these and the Second Law of Thermodynamics.

[x] Referring to Santiago Theory. See Humberto. Maturana and Francisco Varela. 1987, *The Tree of Knowledge: The biological roots of Understanding*. Shambhala, Boston, New Science Library

[xi] Rilling et al, 2002, in Layard, 2005

[xii] Shakespeare, 1995

[xiii] See http://www.recherche.gouv.fr/biodiv2005paris/en/ for the event's web page.

[xiv] See Pritchard, Baldwin and Mayers, 2004; Jowit, 2004; also report on the impact of pollution on human health by the Canadian Health Department: http://www.hc-sc.gc.ca/hecs-sesc/air_quality/health_effects.htm

[xv] A Swiss Re report on climate change can be found at http://www.swissre.com/ under the name "*Opportunities and risks of climate change*".

[xvi] World Resources Institute, Washington DC, www.wri.org

[xvii] United National Environment Programme State of the Global Environment Report www.unep.org/sge

[xviii] Royal Commission on Environment and Pollution, London www.rcep.org.uk

[xix] United Nations Development Programme, Human Development Report 1999 et seq, UNEP, Oxford, Oxford
University Press

[xx] One recent example: Bjorn Lomborg (2000) argues, for example, that energy and natural resources have become more abundant. He provides a case study of how de-linking economic theory from scientific laws leads to false conclusions. For a rebuttal of Lomborg's arguments see Chapman and Parkin, 2003.

[xxi] Inter-governmental Panel on Climate Change www.ipcc.ch

[xxii] Green Ministers web address www.environment.detr.gov.uk/greening

[xxiii] Environment Committee web address www.parliament.uk/commons/selcom/eahome

[xxiv] For an equally agreeable and interesting (and easy to read) excursion into the ideas and personalities of some of the great economists try Robert Heilbroner's *The Wordly Philosophers*. Originally published in 1953, there is a revised edition published by Simon and Schuster (1999) and Penguin Books (2000).

[xxv] Putnam, 2000

[xxvi] Social Exclusion Unit, 1999

[xxvii] UNDP, 1999

[xxviii] Edvinsson and Malone, 1997

[xxix] A point regularly made in talks by the late Nicholas Georgescu-Roegen. His book, *The Entropy Law and the Economic Process* (1971) is seminal, but extremely hard going!

[xxx] See Sustainable Livelihoods Guidance Sheets www.dfid.gov.uk/public/what/advisory/group6/rld/pdf/sectiont.pdf

[xxxi] See www.wessexwater.co.uk/pdfs/STB2000.pdf

[xxxii] Paul Ekins, in his Foreword to Daly and Cobb, 1990

[xxxiii] See www.heps.org.uk for list of publications and more details.

[xxxiv] A report for the DTI Chemicals Innovation and Growth Team: Regulation and Reputation Strategy Development Group, 2002, Forum for the Future, London
[xxxv] These statements were designed in partnership with Keele University, with an ESRC project grant that engaged 60 academics and practitioners. As a set they are comprehensive, internally consistent, culturally neutral, and tried and tested in the Forum's own Directory of Sustainability in Practice. www.forumdirectory.org.uk
[xxxvi] Forum for the Future is working with BSI on an integrated standard: SIGMA, www.projectsigma.com
[xxxvii] See ISO 14040 definition of LCA, www.iso.ch/
[xxxviii] www.thenaturalstep.org
[xxxix] See for example, the demi project www.demi.org.uk
[xl] See for example DETR, 2000
[xli] See for example www.local-regions.detr.gov.uk/bestvalue/bvindex.htm
[xlii] See www.local-regions.dtlr.gov.uk/epplg/3.htm
[xliii] GDP in £trillion: US $7.2, Japan $5.1, China, $2.8, Germany $2.2, UK $1.4; France $1.3, civil society sector $1.3, Italy $1.1, Brazil $0.7, Russia $0.7
[xliv] www.electoralcommission.org.uk. And see www.mori.com, or www.nopworld.com for more statistics
[xlv] The Observer 23rd and 30th January, 2005
[xlvi] See http://df.atalink.co.uk/articles/article-110.phtml
[xlvii] UNEP, 2002 and www.unep.org
[xlviii] See report at:
www.cooperativebank.co.uk/servlet/Satellite?pagename=CoopBank/Page/tplPageStandard&cid=1077610044424&c=Page
[xlix] Source: Reuters 8th November 2004. Their web page is http://www.generationim.com/
[l] www.londonclimatechange.com
[li] See http://news.bbc.co.uk/2/hi/business/3668713.stm
[lii] For more information see http://www.defra.gov.uk/environment/envrp/gas/index.htm
[liii] See HEPS (2004) *Accounting for Sustainability*, London, Forum for the Future, www.heps.org for its application to universities and some useful references
[liv] In the UK new leadership colleges have been set up for local government, further and high education, school management, civil service.
[lv] See the International Panel on Climate Change (IPCC) web site: http://www.ipcc.ch/
[lvi] See U.S. Senate Committee on Commerce, Science and Transportation discussion with Washington D.C.-based Alaska press, 21st January 2005:
http://commerce.senate.gov/newsroom/printable.cfm?id=231171

[lvii] Remarks taken from NATO Round Table meeting on Environmental Security held, on 4th November 1995, US Department of State, Washington
[lviii] Robert McNamara quoting Carl Kayson in a speech at the London School of Economics, November 1995, London.
[lix] Sara Parkin, Global Challenges in the Environment, lecture at NATO Defence College, 9 March 1992, Rome
[lx] Sara Parkin, *Future Strategic Context: Environmental Issues*, lecture to Royal College of Defence Studies, 24 January 2005, and see, for example, the work of Environmental Change and Security Project at the Woodrow Wilson International Centre for Scholars, Washington DC
[lxi] See for example the work the Environmental Agency is doing on local regeneration:
http://www.environment-agency.gov.uk/aboutus/512398/289428/698060/?lang=_e
[lxii] See http://www.neweconomics.org
[lxiii] See http://www.environment-agency.gov.uk/aboutus/512398/289428/656055/?lang=_e
[lxiv] The Economist, 2005
[lxv] Charles Clarke, Evidence to the UK Parliament Environmental Audit Committee, 25th March 2003. (www.parliament.uk)
[lxvi] See for example Learning from Landscapes: http://www.ltl.org.uk/
[lxvii] See
portal.unesco.org/education/en/ev.phpURL_ID=27234&URL_DO=DO_TOPIC&URL_SECTION=201.html

[lxviii] A better quality of life: a strategy for sustainable development for the UK *(1999*)(Cm 4345, London, The Stationery Office http://www.sustainable-development.gov.uk/uk_strategy/ For the forthcoming March strategy see http://www.sustainable-development.gov.uk/
[lxix] See http://www.rcep.org.uk/
[lxx] Quoted in Parkin, 1991
[lxxi] The Ecologist, 1972, A Blueprint for Survival, Vol 2, No 1 (then published by Penguin, London)