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Planet Earth: Our Unsustainable Biosphere

By Anne E. Goodenough

Planet Earth. Our home. Our only life-support system. Clearly then something to be regarded in the highest terms, to be respected, and to be protected at all costs. Yet in 2006, nothing seems further from the truth. The reality is that we are inhabiting an increasingly unstable and unsustainable biosphere.

We are living in a world dominated by problems. Depletion of fossil fuels is occurring at an ever-faster and ever-more unsustainable rate. We are in denial, using resources that take thousands or millions of years to develop and not expecting to encounter problems. We keep discovering new resources of such fuels and this is currently matching our demand, or at least hiding the problem (Middleton, 1999). Yet the day will come when no more oil, gas or coal reserves can be found, not because human ingenuity has failed, but because there simply are no more reserves to be found. Pollution of air, water and soil resources is also becoming an increasing problem. Air pollution affects human health and emissions of gases such as carbon dioxide and methane may be contributing to the current global warming trend. Eutrophication of water resources is also an increasing problem; the extra nitrogen and phosphorous entering aquatic systems as a result of human activity means that eutrophication today is occurring over 100 times faster than it would under natural conditions (Chiras *et al.*, 2002). We are thus impairing our own water quality and decreasing the number of pollution-sensitive aquatic biota, particularly macroinvertibrates and fish which rely on a high dissolved oxygen content (Brönmark and Hansson, 1998).

Habitat loss and degradation is also occurring at an ever-increasing rate. Deserts are expanding due to overgrazing in marginal areas, acidification is causing the destruction of large forest tracts, and several inland water bodies such as the Aral Sea are shrinking and becoming increasingly saline (Middleton, 1999). Even habitats which remain in reasonable condition are becoming increasingly fragmented, so much so that individual habitats are rapidly becoming nothing more than a series of virtual islands (Quammen, 1996). In short, Earth is becoming ever-more patchy. Deforestation is another major problem. Not only does this destroy habitats, often complex ones which took millennia to evolve, but through this process we also cause or exacerbate other problems such as soil erosion and loss of soil fertility. According to Myers (1992), a human-wielded chainsaw can topple a tree in a tropical rainforest in 10 minutes – about equivalent to a one-millionth part of its natural lifespan. Due to deforestation, tropical rainforests now cover less than half of the area they once did, and the Friends of the Earth (1989) estimates an area of nearly 230,000 km^2 (an area the size of England, Wales and Scotland combined) is totally of partially clears each year. This deforestation of nearly 4,000 km^2 per week or 38 hectares every minute (Park, 1992) is something that, through our unsustainable consumerism, we are all involved in. We all have our hands on the chainsaw and we are wielding it with ever-greater energy.

Due to the problems caused by habitat loss, degradation, pollution, the invasion of alien species, and direct exploitation, the extinction rate today is alarmingly high. Baillie *et al*. (2004) estimate the current extinction rate to be 100-1,000 times higher than the baseline rate, with 15,589 known species currently threatened by extinction. Harvard's eminent biologist E. O. Wilson believes that the consequences of this human-induced species extinction are of greater concern than any other threat to our planet. Scientists estimate that 40-100 species become extinct every day (Chiras, *et al.*, 2002). This loss is as unforgivable as it is irreversible.

Do any of these problems matter? Indeed are they problems at all? The short, but emphatic, answer is yes. From a utilitarian perspective, they matter because we are destroying the systems upon which our own lives depend. For a system to be functional at any level, it must be stable and in dynamic equilibrium. If that system is interrupted, modified or fragmented to the point at which that equilibrium is broken, it can no longer function. This concept was demonstrated perfectly by the Biosphere 2 programme: an attempt by scientists to recreate the Earth's natural systems in an anthropocentric structure. At a cost of $150 million, Biosphere 2 had to sustain the lives of just eight human scientists; undertaking gaseous exchange, water recycling, soil rotation, nutrient recycling, and providing water clean enough to drink and soils fertile enough to grow crops. Basically, this was an attempt to recreate nature. It failed to do so for anything other than a very short time period.

From a deeper and more philosophical perspective, one species, during one short time period, is destroying the culmination of millions of years of evolution. Sure, things change in a natural world – planet Earth has always been in a state of flux. Glaciations, tectonic movements, volcanic eruptions, and natural climatic changes are just some of the many ways in which the Earth has changed and evolved over past millennia (Mannion, 1997). However, these changes usually occur either over a relatively small area meaning they have limited impact on the overall biosphere, or over an extremely long period of time allowing gradual adaptation to a changing environment. Such gradual change ensures that systems can remain stable and species can acclimatise to new conditions; not only preventing mass extinctions, but actually creating new species through the processes of separation and speciation (Huggett, 1998). Conversely, human-driven change occurs over the entire globe. Even areas not directly affected by human populations such as Antarctica are not exempt from pollution, climate change, and ozone depletion. Even more importantly, change is occurring at an unprecedented and quite alarming rate, giving no time for gradual adjustment or adaptation.

If we accept that such issues are real, and are problems of a potentially huge magnitude, what then? They are issues for other people, other countries, for politicians, for professional environmentalists, for global policies and international action committees. Agreed? They are nothing to do with us for we couldn't make any difference, even if we wanted to. Could we? Again, the short but emphatic answer is yes. Indeed it has to be yes. We cannot allow ourselves to sit back and indulge in complacency. We are destroying our planet – our only life support system – rather in the same way as we might switch off the power in a hospital intensive care ward and yet expect everything to carry on unchanged. Apathy is as good as acquiescence, and unresponsiveness as good as sealing the fate of the world.

So what can we do? Individually, there are many ways in which we can do our bit to help the planet. Becoming more energy efficient, making use of renewable energy resources, using less water, and using environmentally-friendly modes of transport are just some of the methods we could employ to help reduce pressure on fossil fuels and decrease carbon dioxide emissions. We also have a chance to vote with our pockets and exercise 'green consumerism' by buying foods locally to reduce food miles, buying sustainable products or crops grown in a sustainable way, and 'rewarding' environmentally-aware companies with our custom (Peattie, 1992). Industries can adopt environmental management systems and work to reduce industrial wastage, both in terms of raw material input and emissions – both of which can have economic benefits in addition to environmental ones. Nationally, conserving areas of land and helping with species recovery programmes can help redress the balance for some of the damage we have already done. Internationally, the fight for greater co-operation and agreement between all countries on worldwide issues such as global warming and ozone depletion must go on, and such policies must start to deliver action rather than words. The list could go on and on; often all that is needed is a little thought and imagination. However, prevention is always better than cure and is the only long-term solution to providing local, regional, national and international environmental protection and sustainability.

Will any of this make a difference? Edmund Burke (1783) provides the answer in his statement "nobody made a greater mistake than he who did nothing because he could only do a little"; while Margaret Mead (1969) provides further assurance in her assertion "never doubt that a small group of citizens can change the world: indeed it's the only thing that ever has". Sustainability will not be achieved by edict, but rather by the conscious reconstruction of our own attitudes and actions (Selman, 1996). If enough individuals adopt such changes, society itself will change. Therefore, each and every one of us must act now, and must act quickly, to try and salvage something from the mess we are making of our world. If we don't it will be too late, and in life – unlike in the glorious theoretical world of the computer – there is no 'undo' button to save us. We need to beat the problems that threaten the biosphere before they beat us. Otherwise the concept of a 'silent spring' (Carson, 1962) will become the reality of a silent eternity.

Essay Word Count = 1,509 (+ 192 in the Reference List)

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