

## Biospheric Change and Species Selection

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**Abstract :** Any global disturbance will exert a selective pressure on all species on the planet, including *Homo sapiens*. Earth is changing rapidly and humans are responsible. Global crises are worsening, and some of the worst (e.g., exponential human population growth) are not even being discussed. In the five great extinction crises, species extinction sometimes exceeded 90%. Many species alive at the time of the Industrial Revolution are now extinct. Current trends (e.g., anthropogenic greenhouse gas emissions) indicate a strong probability that more species will become extinct in the 21<sup>st</sup> century. Some species will adapt to irreversible change — some will not.

**Key words :** Natural selection, Rapid change, Ecological overshoot, Economic growth, Humankind's life support system, Population growth.

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### Damaging the Biosphere

A major problem is humankind's obsession with perpetual economic growth, which is a refusal to accept the limits to economic growth imposed by the limits of natural resources on a finite planet. Daly's (1973, 1993) steady-state economics provides a sustainable economic model to replace the perpetual economic growth model, but it has not yet become widely accepted.

One major obstacle to the sustainable use of resources is the delusion that resources are infinitely substitutable (e.g., Simon, 1996). In the 21<sup>st</sup> century, this concept has not proven valid, although it is still dominant. Humankind is damaging the biospheric life support system in the name of economic growth. However, the biosphere is the primary source of resources, which are the raw materials for the economy. Damaging the biospheric life support system to achieve economic growth is stupid and may be suicidal.

One could easily make the case that humankind is its own worst enemy. The fixation on economic growth has resulted in reckless use of resources and the need for ever more consumers. Perpetual economic growth has resulted in using Earth's resources faster than they can be regenerated. Humans are now using 150% of the resources the biosphere can regenerate in one year. This 150% overshoot is made temporarily possible by excessive use of natural capital, which provides the ecosystem services that constitute humankind's life support system. Similar to a financial savings account, using the capital instead of only the interest will soon deplete the account and is the ultimate unsustainable lifestyle. Natural selection will favor those species that do not damage their resource base.

Humankind is also reducing resources per capita with exponential population growth. A finite planet does not have infinite carrying capacity, but humankind is acting as if it does. Humankind understands carrying capacity for spaceships, airplanes, elevators, hotels, cattle ranches, and football stadiums, but carrying capacity of Earth for humans is not even discussed by politicians or the citizens they represent. The global human population in 1927 was 2 billion; in 2010, the total is nearly 7 billion, over a three-fold increase in less than 100 years. If *Homo sapiens* does not keep its population within Earth's carrying capacity, the universal laws of biology, chemistry, and physics will do so — the sight will not be attractive. As resources per capita decrease, *Homo sapiens* will face selective forces that affect species that do not stay within the carrying capacity of their environments.

### Climate Change

The eight interactive global crises (human economy, climate change, exponential human population growth, ecological overshoot, biotic impoverishment and the reduction of biodiversity, renewable resource depletion, energy allocation and environmental refugees) are all anthropogenic stresses on the biosphere that strongly affect evolutionary processes. A biosphere quite different from the present one is increasingly probable and will unlikely be as favorable to *Homo sapiens* as the present circumstances. To counter the bad news, people often list the splendid activities being postulated for sustainable use of the planet, but they have not diminished any of the eight global crises (Cairns, 2010). Major tipping points may be passed in the near future, but a sense of urgency is not being shown. In addition,

a well organized campaign is casting doubt on science and discrediting scientists (e.g., Oreskes and Conway, 2010). The news media has exacerbated this tragic situation by espousing the concept of “balance,” which ignores the preponderance of scientific evidence and insists on equal representation of both views even when the scientific evidence (e.g., global warming) overwhelmingly supports one side.

The risks of global climate change have been known for decades, but no substantive action has been undertaken to reduce the risks. As a consequence, the risks have worsened. The primary reason is that a tiny number of well financed doubters have persuaded the news media and the public that precautionary action is too expensive and the science is too uncertain. One example of the tactics used for acid rain follows.

*The energy industry had often accused environmentalists of scare-mongering, yet this is just what they had done with their claims of economic devastation. Protecting the environment didn't produce economic devastation. It didn't lead to massive job losses. It didn't cost hundreds of billions of dollars. It didn't even cause the price of electricity to rise. And the science was correct all along. As Mohamed El-Ashry of the World Resources Institute was quoted in Newsweek, 'when we waited for more research on acid rain, we ended up realizing that everything we knew 10 years earlier was true (Oreskes and Conway, 2010, p. 103).*

The same tactics were used on tobacco smoke, the ozone hole, and now global climate change. In every case, science won, but the costs of delay to human health and the environment were high. During the time lost because the doubters and deniers successfully blocked remedial measures, the universal laws of physics, chemistry, and biology were fully operational, so the selective pressures on *Homo sapiens* increased.

At almost every meeting on global crises, at least one person states that someone (often a deity) or something (e.g., usually technology) will “save” humankind. Thus far, this belief has not worked well for the billions of people who are malnourished or starving, lack potable water, have inadequate shelter and medical care, and lack financially sound retirement plans. None of the eight global crises is getting less risky. Special interest groups sowing doubt about tobacco, acid rain, ozone depletion, effects of burning coal, and now global warming are delaying remedial action on all these problems. Perhaps scientists and

science deserve more respect when they provide massive evidence published in peer-reviewed journals.

Optimists often give a litany of the positive efforts now being made, such as low energy light bulbs, recycling, protecting biodiversity, and non-carbon alternative energy, but the important consideration is: are these efforts reducing the impact of global crises on humankind? Thus far, they have not done so.

## Conclusions

Selective pressures affect *Homo sapiens* just as they do all other species on the planet. Technology (e.g., geoengineering) temporarily may treat some of the symptoms, but it may also produce deleterious side effects. Since the human economy is a subset of the biosphere and is dependent upon the resources it provides, nurturing the economy should not have a higher policy priority than the biosphere (i.e., the environment). The biospheric life support system has provided the environment in which humankind evolved and flourished. Continued unsustainable practices are not prudent, which, if continued, will cause biospheric disequilibrium. Evolution will eventually produce a new biosphere better adapted to the new conditions, but not likely to be as favorable to humankind as the present biosphere. Selective forces will be responsible for all the changes that occur — for example, increased anthropogenic greenhouse gas emissions and increasing ecological overshoot will result in many increased selective pressures.

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