

Environment, health and sustainability

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Environmental health has roots in Greek science, supplemented by knowledge painstakingly accumulated through centuries of observations of occupational health and disease, especially among miners and other workers exposed to high levels of heavy metals and other toxic materials. Understanding widened in the 19th century, particularly as the connections between environmental conditions and infectious diseases started to be uncovered. The long-known association in some places (including ancient Rome) between swamps, “miasmas” and fevers became understood to be mainly from insect vectors breeding in water, and their transmission of agents causing diseases such as malaria. Later, the range of vector-borne fevers expanded to include viruses such as dengue fever. Cholera was shown to be passed to vulnerable recipients through the drinking of faecally contaminated water.

In the 20th century the field of environmental health expanded again, to include the effects of dirty air and health, spurred by severe air pollution events in Belgium and Britain, and the slow acceptance that smoking tobacco is injurious to health. Roughly in parallel, the invention of synthetic molecules such as DDT (used to combat mosquito and other insect-associated diseases) and pesticides (used to grow more food) stimulated another field of environmental health; that of the “bio-accumulation” and sustained duration of some molecules in human and animal tissue, especially in fat, and their possible relationship with conditions such as cancer, Parkinsons disease and, with less certainty, a wide range of other disorders.

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However, as the end of the 20th century neared, concerns arose over a new form of environmental health risk, which is fundamentally different in scale and severity to all that has gone before. This concerns sustainability and health. Although the life cycles of empires had long been understood, at least by historians, the use of nuclear weapons in Japan in 1945 revealed that it might be possible for humans to destroy civilisation on a global scale. This concern grew during the Cold War, as the two main antagonists accumulated arsenals on a sufficient scale to cause “nuclear winter” many times over. This is a prolonged global haze likely to kill all plant (and hence animal) life. Experts calculated that only a small fraction of the nuclear weapons in existence would need to be exploded for this catastrophe to occur.

Then, roughly at the same time as humans ventured into space, awareness increased that our species is altering the environment on a planetary scale, a phenomenon which is completely unprecedented. These changes have three main forms: (1) the accumulation of waste gases on a sufficient scale to superimpose human driven changes onto the natural fluctuations of the global climatic system, (2) degradation of planetary ecosystems and biodiversity (including in the ocean) and (3) the thinning of the stratospheric ozone layer. Action and new technology has greatly slowed the most recently discovered of these changes, but the rate and severity of the first two changes is still accelerating, despite an increasingly concerned coalition of scientists and activists.

In turn, each of these phenomena is related (and increasingly conceptualised as related) to the integrated outcome of the expanding scale of the human enterprise, as global population rose from about 1.6 billion in 1900 to almost 7.5 billion today. Of course, the cause for these new threats is not just additional people. But in processes of co-evolution and dazzling invention,

human ingenuity has wrested new sources of energy from Earth's resources, harnessing these to new technologies which have enabled the clearing of forests, the trans-oceanic movement of food, and a myriad of other developments which make modern life possible. In sum, these changes are increasingly called the "Anthropocene", the human-dominated age. Such changes have had great benefits for our species, but have imposed costs on many others, including long-lived mammals and birds, which are almost unbearable to contemplate.

Concerns about the long-term continuity of civilisation first arose in the 1960s, as policy makers and many people became aware that the global population was rising at an unprecedented rate, which crested at about 2% per annum in 1969. However, public concern over this then faded (prematurely, I argue) as oral contraception became more available, as the Green Revolution lifted crop yields, and as famines declined and health improved.

A minority disagreed, including one of the world's best known environmental health scientists. In 1993 Tony McMichael proposed a new form of environmental health; issues that potentially undermine what he called "life support mechanisms." This idea is fundamentally different from the other kinds of environmental health mechanisms that have been described.

The difference between these "anthropogenic" effects and other aspects of environmental health lies mainly in their scale, their interactions with human behaviour, and the long causal chains between exposure and effect. Events such as the growing number of refugees, the emergence of a growing number of walls and razor wire barriers along borders, and the scale of insurgencies and attacks are all manifestations of this. Although many of the linkages in these causal chains remain under-appreciated within science and government, there is an increasingly rich scientific literature which underpins this growing field.

References

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