

17.1: We Cannot Go on Like This

In 1968 the Stanford University biologist Paul Ehrlich published a book entitled *The Population Bomb*,¹ a pessimistic work that warned Earth had reached its population carrying capacity sometime in the past and that catastrophe loomed. Ehrlich predicted rapid resource depletion, species extinction, grinding poverty, starvation, and a massive dying of human populations in the relatively near future. “Not so,” retorted Julian Simon a University of Maryland economist writing in a number of books, the most recent of which, finished just before his death in 1998, is titled *Hoodwinking the Nation*.² Ehrlich hedged his views by stating that he might be wrong and that “some miraculous change in human behavior” or a “totally unanticipated miracle” might “save the day.” Simon expressed the view that Ehrlich’s doom and gloom views were nonsense and that human ingenuity would overcome the problems foreseen by him.

The debate between Ehrlich and Simon led to a famous wager by Simon in 1980 that \$200 worth of each of five raw materials chosen by Ehrlich—copper, chromium, nickel, tin and tungsten—would actually decrease in price over the next 10 years in 1980 dollars. Each did in fact decrease in price and Ehrlich paid. Simon then offered to raise the ante to \$20,000, a proposition that Ehrlich declined. (After 1990 there were some spectacular price increases in these and other mineral commodities.)

The Ehrlich/Simon wager is often cited by anti-environmentalists as evidence that we will never run out of essential resources and that a way will always be found to overcome shortages. However, common sense dictates that Earth’s resources are finite. Whereas unexpected discoveries, ingenious methods for extracting resources, and uses of substitute materials will certainly extend resources, a point will inevitably be reached at which no more remains and modern civilization will be in real trouble.

Unfortunately, the conventional economic view of resources often fails to consider the environmental harm done in exploiting additional resources. Fossil fuels provide an excellent example. As of 2005, there was ample evidence that world petroleum resources were strained as prices for petroleum reached painfully high levels. This has resulted in a flurry of exploration activities including even drilling in some cemeteries! Natural gas supplies have been extended by measures such as tapping coal seams for their gas content, often requiring pumping of large quantities of alkaline water from the seams and release of the polluted water to surface waters. There is no doubt that liquid and gaseous fossil fuel supplies could be extended by decades using coal liquefaction and gasification and extraction of liquid hydrocarbons from oil shale. But these measures would cause major environmental disruption from coal mining and processing, production of salt-laden oil shale ash, and release of greenhouse gases.

The sad fact is that on its present course humankind will deplete Earth’s resources and damage its environment to an extent that conditions for human existence on the planet will be seriously compromised or even become impossible. There is ample evidence that in the past civilizations have declined and entire populations have died out because key environmental support systems were degraded.³ A commonly cited example is that of the Easter Islands where civilizations once thrived and the people erected massive stone statues that stand today. The populations of these islands vanished and it is surmised that the cause was denuding the islands of once abundant forests. A similar thing happened to pre-Columbian Viking civilizations in Greenland, where 3 centuries of unusually cold weather and the Vikings’ refusal to adopt the ways of their resourceful Inuit neighbors were contributing factors to their demise. Iceland almost suffered a similar fate, but the people learned to preserve their support systems so that Iceland is now a viable country.

There is much truth in the expression that, “The only thing we have to do to ensure a planet uninhabitable by our descendants is to continue what we are doing now.” Fortunately, modern civilizations have the capacity to avoid the fates of the ancient Easter Islanders and Greenland Vikings—if they can muster the will and the institutional framework to do so. The key is sustainability, which simply means living in ways that do not deplete Earth’s vital support systems. The great challenges to sustainability are (1) population growth beyond Earth’s carrying capacity, (2) potentially disruptive changes in global climate, (3) provision of adequate food, (4) depletion of Earth’s resources, (5) supply of adequate energy, and (6) contamination of Earth’s environment with toxic and persistent substances. It won’t be easy to overcome these challenges and achieve sustainability and it is by no means certain that humankind will ultimately succeed or even survive on Earth. But we have to try; the alternative of a world population reduced to just a few million people surviving in poverty and misery on a sadly depleted planet under conditions hostile to higher life forms is too grim to contemplate.

The achievement of sustainability will require adherence to some important principles. These can be condensed into ten commandments of sustainability, which are listed below:

1. Human welfare must be measured in terms of quality of life, not just acquisition of material possessions, which demands that economics, governmental systems, creeds, and personal life-styles must consider environment and sustainability.

2. Since the burden upon Earth's support system is given by the relationship $\text{Burden} = (\text{number of people}) \times (\text{demand per person})$ it is essential to address both numbers of people on Earth and the demand that each puts on Earth's resources.
3. Given that even at the risk of global catastrophe, *technology will be used* in attempts to meet human needs, it is essential to acknowledge the anthrosphere as one of the five basic spheres of the environment and to design and operate it with a goal of zero environmental impact and maximum sustainability.
4. Given that energy is a key to sustainability, the development of efficiently-used, abundant sources of energy that have little or no environmental impact is essential
5. Climate conducive to life on Earth must be maintained and acceptable means must be found to deal with climate changes that inevitably occur.
6. Earth's capacity for biological and food productivity must be maintained and enhanced, considering all five environmental spheres.
7. Material demand must be drastically reduced; materials must come from renewable sources, be recyclable and, if discarded to the environment, be degradable
8. The production and use of toxic, dangerous, persistent substances should be minimized and such substances should not be released to the environment; any wastes disposed to disposal sites should be converted to nonhazardous forms.
9. It must be acknowledged that there are risks in taking no risks.
10. Education in sustainability is essential; it must extend to all ages and strata of society, it must be promulgated through all media, and it is the responsibility of all who have expertise in sustainability.

Each of the ten commandments of sustainability is discussed in the remaining sections of this Chapter.

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